VOL. XVIII NEW YORK—THURSDAY, JANUARY 30, 1908—CHICAGO No. 5

THE AUTOMOBILE

Taxicabs Unaffected by Weather Condition

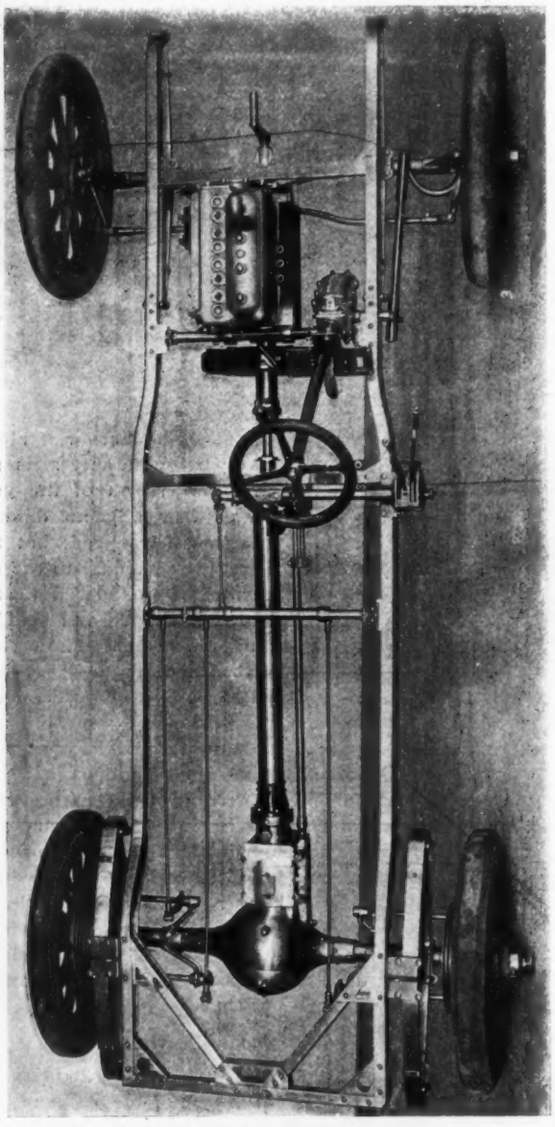
by W. F. Bradley

THE psychologist is better fitted than the mere automobile observer to explain why the teamster is most effusive when he is doing the least amount of effective work. When New York woke up last week to find that a vigorous baby blizzard had come in from the northwest during the night and taken possession of the city, it was the teamster body that chuckled most heartily, metaphorically patted itself on the back and went forth to plunge through a foot of snow, add confusion to confusion, but remain happy as a sand lark through it all.

Adverse weather conditions, whether from frost or snow, not only disorganize the horse traffic of the city, but are the direct cause of the horse traffic disorganizing every other means of surface transportation. Electric trolley cars soon had their right of way cleared for them by means of powerful plows and revolving brushes; automobiles fitted chains and were able to run about any part of the city after the first snowstorm of the year with practically no diminution of their speed; but the horse was unequal to the occasion; it floundered in the snow; it slipped and skidded and fell where snow had given place to a glassy surface; it was mobilized for the removal of the snow, but was so unequal to the task that often when a white load had been shipped the patient animals collapsed, or were unable to get under way without extraneous help. Meanwhile passengers in surface cars and cabs fumed as they were held up in blocked traffic for any time from five to twenty minutes, and cursed the snow which was the cause of the delay. The minority who found themselves encased in a double team crosstown horse car, which the city maintains as an exhibition of how we used to travel, put the blame where it properly belonged, but very few thought of charging the horse with traffic disorganization.

THOMAS TAXICAB DEMONSTRATING IN SNOWBOUND COLUMBUS CIRCLE IN COMPANY WITH A LARGE AUTOMOBILE FAMILY.

Yet the fact remains that New York, in common with hundreds of other cities, loses time and money through the inability of the horse to perform its accustomed duties whenever a snowstorm of any severity descends. The point to be noted is that not only the horse owners and users suffer inconvenience and loss, but that others, who would not otherwise be affected, have to bear the burden of the breakdowns. If conditions were reversed, and the newly arrived automobile obstructed traffic whenever weather conditions were unfavorable, the necessity for a more reliable service would be immediately grasped. Centuries of habit, however,



CHASSIS OF THE FOUR-CYLINDER THOMAS TAXICAB.

blind one's eyes to obvious defects. Instead of the conclusion that horse traffic is no longer adequate for modern city conditions, the oldest form of locomotion is quietly accepted as the inevitable.

In the earlier hours of the morning, before removal gangs had thoroughly warmed up to their task, some of the Fifth Avenue gasoline 'buses had trouble getting round corners where snow was particularly deep. But their inability to perform their task as regularly as usual was entirely due to neglect to fit chains or some other anti-skid device to the smooth, solid tires. Heavy three and five ton trucks, with full loads aboard, rumbled along as usual when their solid tires had received some temporary bandage. Private automobiles found half the usual width of roadway rather narrow quarters in which to turn round, and long wheelbase cars needed to be skilfully handled in crowded crosstown streets; but they never refused to do their work.

The absurdity of the law against chains in certain sections of the city was never more forcibly apparent than during the period of the snowstorm. A few car owners, knowing that the police would be little in evidence in a snowbound park, ventured on forbidden ground, with wheels well equipped with chains and other devices of a similar nature, and had the satisfaction of proving that a considerable depth of snow is needed to stop a modern car. Flying through drifts at thirty-five miles an hour is an exhilarating experience.

Taxicabs Quick and Reliable When Conditions Are Bad.

But it was the taxicab which shone out most brilliantly when city traffic was in a state of anarchy, the little gasoline vehicles making light of a road surface that held up all horse vehicles, and working a route between piled up banks of snow, through which heavy teams and surface cars struggled for right of way, in a manner that was a revelation to traffic inspectors. First experience with wintry weather showed that there would never be any delay if all means of transportation were as reliable as the taxicab.

Though the diminutive power plants under the diminutive bonnets were only designed for economical use under normal city conditions, they met the strain put upon them in excellent style, not a single cab being stalled about the town or on the steep, snowy grades of Washington Heights, to which many a user directed them, with a certainty of being able to reach home quicker by this method than by any other.

Rather more gasoline than usual must have been consumed, for it was sometimes necessary to slip into the intermediate or drop down to the low gear on the snowclad grades. One passenger has a story of how a short ride would have cost him dear if he had not departed in fright at the rapid rate the figures were adding up a total on the telltale indicator. The vehicle, which was without chains, was engaged for a run of about a dozen blocks. Before a dozen yards had been covered the cab was blocked in deep snow, the driver raced his motor, the wheels flew round, a shower of ten cents appeared in rapid succession on the indicator, and the vehicle stood still. Then the fare bolted rather than face that grand total. Though the case is an exceptional one, and would not have occurred if the wheels had been equipped with chains, it is worth asking, in view of the fact that some cities to which the cabs will be introduced have much more snow than New York, if the indicator should not always be driven from the front wheels, instead of the rear.

Drivers Found Business Brisk During Storm.

Taxicab business was particularly brisk during the height of the storm, every cab being snapped up as it entered its stand, and some would-be traveler always being in waiting for the arrival of a vehicle. One driver cooling his heels outside a private residence while his clockwork mechanism rolled up ten cents at regular intervals of six minutes declared enthusiastically:

"Gee, I guess we are doing business this weather! Why, I haven't had time to get a bite of lunch yet—it was then two o'clock—and the longest I have loafed this morning has been three minutes. You see," he added confidentially, "we are the only people who can get around with the streets in this condition, and everybody wants us.

"You bet that little engine can get through it all right. I was downtown yesterday in the early morning, when the snow was up to the axles, but she never stuck. I guess them leather bands can pull you through anywhere. They are

giving us a gallon of gasoline free every Monday morning, so that we shall have no excuse for freezing up. It isn't much if the weather is really cold, and you have to keep the engine turning over, but it is better than nothing."

Thomas chose the height of the snowstorm for demonstrating to Father Knickerbocker the new taxicab which he has designed at the Buffalo factory. E. C. Morse, manager of the E. R. Thomas Company, arrived with one cab, and during the stormy period of Friday and Saturday was skimming over the city with the heads of transportation companies interested in the latest form of rapid transit. It would have been impossible to have selected more strenuous conditions or a set of roads which more thoroughly tried the ability of the little town car, yet it responded in a thoroughly satisfactory manner. Manager Morse declares that he is negotiating with a number of large firms and fully expects to see a big series of Thomas taxicabs on the streets of New York within a few months. The first batch has just been sent to Chicago and has already been put into circulation. The interesting feature of the Thomas cab is that it is the first specially designed American-built taxicab, which is being turned out in any quantities. "Deliveries can be made," said Mr. Morse, "in less than six weeks for moderate quantities, and larger quantities in two months. We have made arrangements at our factory for a large output and have a capacity of two thousand machines from now to the end of September."

Externally, the Thomas taxicab differs from those in use in this city by being finished in artistic but sober colors, giving the vehicle more the appearance of a private carriage than a public conveyance. In general lines it closely follows European standards, having been designed by an engineer closely connected with French practice. One of its most noticeable features is a four-cylinder engine in a single casting, the inlet and exhaust manifold and the water outlet manifold being cast integral with the four cylinders. Dimensions of the cylinders are 3 3-8 inches by 4 5-16 inches bore and stroke, giving a rating of 16-22 horsepower. The crankcase, water intake manifold, water-jacketed carbureter and gear cases form one manganese bronze casting, the entire power plant thus being composed of two castings only. An innovation is the absence of a center crankshaft bearing, the two end bearings, however, being of specially liberal dimensions. Ignition is by means of high-tension magneto, and water circulation is by thermo-siphon, with a honeycomb radiator set exactly over the front axle.

With a view to extreme simplicity, the transmission has been encased in the rear axle, the car thus consisting, in reality, of a simplified engine at one end and a rear axle and transmission at the other. Wheelbase of the cab is 103 inches, which, together with a very wide steering angle, makes it possible to turn round in a very restricted space.

How Patrons of One Hotel Insist on Taxicabs.

It has not required a very long acquaintance with taximeter cabs to prove to the public in what direction they can obtain the best and quickest transportation service, as is shown by an incident at the Waldorf Astoria. The patrons of that elegant hostelry are supplied with a horse cab service, furnished by an outside liveryman, but may have taxicabs by requesting the management to telephone to the company's headquarters for one. So many persons showed a preference for the mechanical form of transportation, with a clock to announce the amount of fare due, that the manager of the hotel was at last obliged to inform his liveryman that gasoline taxicabs must be installed instead of horse vehicles.

At the office of the assistant manager of the Waldorf Astoria, ignorance was professed of the entire story, but the information given that the hotel was always willing to send for a taxicab when visitors preferred this mode of locomotion to the vehicles at the door. A notice to this effect indeed appears in the main hall. At the William H. Seaich livery stables, from which the Waldorf cabs are supplied, everybody desired to be mute on the passing of the horse. As those particularly interested in the change have been spending considerable time recently in demonstrating taxicabs, the indications are that the story, if not correct in every detail, is at least right in its essentials.

UPPER BROADWAY REMAINED SNOWBOUND FOR SOME TIME, BUT AUTOMOBILE SERVICE NEVER SUFFERED.

BOSTON SOON TO HAVE TAXICABS.

BOSTON, Jan. 27.—A taxicab service is among the probabilities of the near future in this city and already there is one experimental cab on the streets, while a company has been organized to introduce a service here similar to the one in New York. The Boston Taxicab Company, which was incorporated recently in Massachusetts, is behind the plan, and it is understood that this company is a subsidiary of the New York Taxicab Company, which operates a large number of four-cylinder Darracq cabs in that city.

NOW AUTOCABS FOR QUAKERTOWN.

PHILADELPHIA, Jan. 27.—Secretary-Treasurer L. T. Layton, of the Philadelphia Taxicab Company, is authority for the statement that his concern will be ready within a month to inaugurate its business here with at least fifty vehicles.

The local company, which is capitalized at $200,000, is composed of men prominent in the affairs of the city.

NINTH ANNUAL BANQUET OF THE AUTOMOBILE CLUB OF AMERICA, HELD JANUARY 25, IN ASSEMBLY HALL OF NEW CLUB HOUSE, FIFTY-FOURTH STREET, NEW YORK CITY.

A.C.A. BANQUET A GATHERING OF THE OLD GUARD

THE ninth annual banquet of the Automobile Club of America, held Saturday evening, January 25, in the palatial home of the pioneer autoing club of America, was remarkable for a goodly representation of the old guard of automobiling. As the A. C. A. was the first club formed in this country, it secured a membership which embraced not a few from other cities, and while many of these have become directors of local clubs, they elect to continue their membership in the big metropolitan organization. Since it was a gathering in vast degree of the early advocates of the motor-driven vehicle, it was not amiss that M. Jusserand, the French ambassador to this country, should be the guest of honor, it being a recognition of the debt which this and other countries owe to France for being greatly responsible for the coming of the automobile. While the pupil now considers that he is capable of instructing as well as the master, it is only fair to remember that the first chapters were learned from the lessons and experiments of the French makers, who, in the past, have certainly accomplished much to blaze the way for automobiling's progress.

President Colgate Hoyt, who presided at the head table with his accustomed dexterity, complimented the club members upon the condition of their organization. The new home on West Fifty-fourth street possesses ample garage accommodations and boasts of a dynamometer superior to any other ever installed. Commented the president:

"The property in which we are now housed will have cost not far from $800,000. This money has been furnished as follows: By the club, $170,000; by a first mortgage at 4 1-2 per cent. interest, $350,000, which was secured, by the way, through the efforts of our treasurer, Mr. Fanshawe, without any commission being charged to the club; by a second 4 per cent. mortgage, furnished by the members at par, $300,000; and although we have only been occupying this present house for eight months, through the wise handling of finances we have been able to draw from the bonds held by the members and pay off and cancel same, at par and interest, to the amount of $40,000, leaving the total mortgage obligations of the club now $610,000, against $650,000 when we moved in."

Warmly welcomed was the French ambassador when he arose. In the course of his speech he said:

"One of the earliest dreams of mankind has been one of the last to be realized, and it has been realized only now under our very eyes—the conquest of space, the abolition of distance. To be able to flash your thought across continents and oceans is admirable; to have your voice carried through wires, and now without wires, is a wonder. But nothing can ever equal real presence, the actual transportation of your own person—thoughts, words, body and all—where you want to be. This the men before us could do only in their imagination. The Orientals had King Solomon's carpet, Ruggiero had his hippogriff, Rabelais had his movable roada, we have our automobiles, and we equal them all.

"When I think of the change this invention, while it is yet in its infancy, has worked in the world, I am proud to think that it is a French one. France is the mother of many men and many things. The genius of the race shows, luckily, no trace of age or of fatigue. It has never been more fruitful, having of late years given to the world the first dirigible balloons, the first submarine boats, that extraordinary metal, radium, and all that the discoveries of Pasteur mean for the alleviation of the sufferings of men. It has cut the Suez Canal; it has begun the Panama one.

"One of her sons, Dr. Laveran, has just received the Nobel prize for his discovery of the noxious action of mosquitoes in the spreading of fevers. And it has given the world the automobile."

Senator Chauncey M. Depew responded to the toast, "America, the User of the Automobile." His remarks included an excellent dissertation upon good roads, and he showed by statistics the increase in automobiling.

Augustus Thomas, the playright, with "The Automobile and the Pedestrian" as his subject, supplied a budget of excellent humor, which was duplicated and even excelled by the scintillations of the Hon. Job E. Hedges, whose subject was simply announced as "Automobiles." Persistent calls for Patrick Francis Murphy, one of the most accomplished after-dinner speakers, finally took him to the speaker's rostrum, from whence he proceeded to turn the tables on President Hoyt for having disregarded his promise not to call upon him for any remarks.

At the guest table, besides the orators of the occasion, were Dave Hennen Morris, during whose presidency the clubhouse project was successfully set in motion; Albert R. Shattuck, another ex-president, always active if not entirely effective in his methods; Dr. Schuyler Skaats Wheeler, the man responsible for the dynamometer; Col. John Jacob Astor, a persistent buyer of automobiles; the Hon. Jotham B. Allds, the New York senator who is shortly going to have something admirable to propose in the way of directing the good roads work in this State; Oliver A. Quayle, the indefatigable president of the New York State Automobile Association; Charles J. Edwards, the newly elected president of the Long Island Automobile Club; Gen. George Moore Smith, chairman of the club's show committee; Rev. Wilton Merle Smith, the club's chaplain, and Henry Sanderson, director of the club's garage department.

Scattered about the room were men who have been prominent in automobiling since its inception. At one table sat Alfred C. Bostwick, one of the early "daredevils" of the sport; not far away was the industrious Walter Christie, holder of the world's one-mile track record. A. L. Riker, winner of the first road race held in this country, was another ex-racing notable; Percy Owen, once a member of the American Gordon-Bennett team, was also present. Jefferson deMont Thompson, chairman of the A. A. A. Racing Board and Vanderbilt Cup Commission; A. R. Pardington, who once filled the same dual rôle, and Frank G. Webb, the vice-chairman of the 1908 Racing Board, were gathered at one table. Another in evidence was Robert Lee Morrell, also A. A. A. ex-chairman of Racing Board and Cup Commission.

Cortland Field Bishop, president of the Aero Club of America; Alan R. Hawley, and Augustus A. Post composed a prominent sky-pilot trio. Milo M. Belding, Jr., former chief counsel of the New York division of the L. A. W., and C. J. Obermeyer, once president of the L. A. W., were two cyclists who linked the past with the present.

Windsor T. White, S. T. Davis, Jr., S. D. Waldon, E. T. Birdsall and A. H. Whiting were observed in the old guard trade contingent, which also included W. D. Gash, E. B. Gallaher, Frank Eveland, Walter C. White, Peter Fogarty, Gaston Plantiff, C. R. Mabley, R. A. Greene, Charles E. Miller, C. R. Teaboldt, J. F. Plummer, E. R. Hollander, A. J. Picard, E. R. Partridge and H. R. Lounsbery, Jr.

Then there were Albert N. Chandler, president of the Automobile Club of Philadelphia; Frederick H. Elliott, secretary of the A. A. A., Gage E. Tarbell, of life insurance fame; Col. L. C. Weir; Capt. Homer E. Hedge, who was one of the first movers in the organization of the A. C. A., as well as the Aero Club; William Pierson Hamilton, active in the club's show promoting; Robert Graves, owner of racing cars; H. M. Swetland; L. R. Smith; J. Dunbar Wright, the globe-traveler; Waldron Williams; T. Francis Moore, Briarcliff racing secretary; Louis and Andre Bustanoby; Orrel A. Parker; Charles H. Hyde; W. W. Niles; R. C. Newton; Lowell M. Palmer, Jr., and Arthur J. Moulton.

Two of the notable absentees were Winthrop E. Scarrit and George F. Chamberlain, both of whom have done much to aid in the progress of automobiling and who have also been especially active in A. C. A. matters. The metropolitan and trade press was well represented.

THROUGH KENTUCKY, DOWN INTO TENNESSEE

By PATHFINDER.

IN continuation of our tour of exploration, told of in the January 23 issue of THE AUTOMOBILE, we have covered a trifle over 500 miles since leaving Columbus, O. Two-thirds of this mileage has been in Kentucky—a State which offers as much of interest to the tourist as any in which I have ever traveled.

Leaving Columbus we continued due west, and followed the National Highway to Springfield. This stretch of 45 miles offers unusual opportunities for speeding. Straight as an arrow, for the most part perfectly level, free from ruts, and not passing through any towns of size, the distance can readily be covered in an hour and a half, provided, of course, that there are any tourists who ever exceed the legal limit of 20 miles per hour. Three miles west of Springfield we turned off the National Highway, not without a feeling of regret, as we had traveled on this one road for about 320 miles. What a change was noticeable as soon as we turned off the Highway! Instead of a wide, straight highway, with few, if any turns, we had a narrow little lane, winding back and forth across the railroad. The surface was good, however, and we soon reached Dayton, 71 miles from Columbus. Here we looked into our water tank and saw that we had used but a gallon of water on the 71 miles—a striking demonstration of the efficiency of the condensing system in the White steamer of to-day.

THIS LOOKS VERY MUCH LIKE A REAL OLD HOME IN KENTUCKY AND THAT'S WHERE IT IS.

From Dayton a fair pike leads to Cincinnati by way of Miamisburg, Bethany and Reading. There is little chance that one will go in the wrong direction in this vicinity. While still 20 miles from Cincinnati, we saw before us the cloud of soft coal smoke which hangs over the city, and by the time we reached our hotel we were covered with soot. Our odometer showed 125 miles for the trip from Columbus.

None of us had ever been in Kentucky, and we started out eagerly the next morning and crossed the toll bridge, which carried us over the Ohio river into Covington. From this town we had a gradual three-mile climb on a wide, slippery road, which, like much of the Kentucky roads, I fear would be rather bad in wet weather. While we were in the State, I should say here, we were favored by clear weather, although we felt the effects of the cold wave which has swept the northern States.

The first 25 miles out of Covington is over a toll road, and we paid a total of 81 cents on this stretch. We did not have to pay toll again in the State, although we saw thereafter many abandoned toll gates testifying to the fact that, until recently, toll was collected on most of the pikes. After leaving the toll road we reached a stretch where the road parallels the Queen & Crescent Railroad, and in 35 miles we took note of 28 railroad crossings, all over the same line. The turns across the track were often very abrupt, as were the turns over the bridges which span the tracks, and we found that great caution was necessary in approaching these crossings. The road from about 50 miles to 70 miles out of Covington leads through a hilly and rather lonesome country. The turns in the road are numerous and of extreme sharpness, and the same care was necessary as in the section above alluded to.

Horses and Mules Numerous.

As we neared Georgetown the road straightened out and widened out, but here a difficulty presented itself, which, in greater or less degree, has been with us ever since—namely, the trouble in passing horses and mules. It happened that County Court was being held that day in Georgetown, and this occasion is, by local custom, a time for general horse trading. Every one in the county who raises horses or mules—which is almost equivalent to saying the entire population—had come into town to buy or to sell. We met numerous combinations, such as the following: A man driving a team with one hand and with the other holding the halters of two or three newly purchased horses, which traveled behind his buggy. The horses were for the most part young and untrained, and the trouble in passing them may be imagined. We gave every assistance possible and most of the horsemen accepted the situation as a matter of course. There were one or two, however, who made sundry remarks regarding what they would do if they "had their gun." For traveling in Kentucky, sir, you will find it an advantage if your engine can be stopped when desired and easily restarted, and the more quietly you can start the more serene will be your progress.

There is a fine road from Georgetown to Lexington, and at the latter place, 88 miles from Cincinnati, we spent the night. Lexington is the center of the horse-raising section of the State. Good roads radiate from the city in every direction, connecting it with the great stock farms. The main street, just beyond the built-up section of the town, has been widened into a great speedway, where famous trotting horses are even more common than racing cars at Ormond and Briarcliff. Lexington was the home of Henry Clay, and we visited his old homestead outside of the city, as well as his monument in the cemetery.

Leaving Lexington, we had a splendid macadam road to Frankfort, 26 miles away, the capital of the State. Here we saw much of interest: the monument to Daniel Boone, the old State arsenal, the Capitol Hotel, where Goebel died, and the century-old State House, which impressed us even more than the magnificent new State House now nearing completion.

Bryan Orthodox on Roads Question.

It chanced that William J. Bryan, of Lincoln, Neb., was in Frankfort when we passed through. We talked with the famous orator and sounded him as to where he stands on the good roads question. We found that on this topic his views are entirely orthodox.

We had a very uneventful trip from Frankfort into Louisville, 80 miles from Lexington. This section of the State was settled very early, and we saw some fine examples of real colonial architecture. The last 15 miles into Louisville was over a fine, straight, perfect macadam road. We were very favorably impressed with Louisville, particularly with the wide well paved streets and the fine Hotel Seelbach. In the morning we drove through Cherokee Park and other parts of the city, so that it was noon before we headed southward.

The road was reasonably good for 40 miles, as far as Bardstown, one of the oldest settlements in Kentucky. I might say here that it was not until we had traveled more than 100 miles from Bardstown that we again saw a community that was anything more than a cross-roads hamlet. Beyond Bardstown, the country became wilder and the road gradually grew poorer. At Buffalo, 69 miles from Louisville, began a long stretch of very bad going. There was sand, mud, rock, water; in fact, everything except a smooth hard road. Eighty-five miles out from Louisville we crossed an iron bridge about 100 feet long, for which 40 cents toll was exacted.

We had realized all day that we would have to "rough it" that night and our expectations proved correct. We put up at a cross-roads, called Canmer, in a "hotel" which had three rooms for guests. We were served with sausages and raspberry jam for dinner and the same menu for breakfast. Our host sat down at the table with us, with his hat on, and asked us innumerable questions about ourselves. Incidentally, we obtained considerable information from him, including the fact that our road passed within 12 miles of the Mammoth Cave. We determined to take in this great natural curiosity, ranked as one of the "seven wonders of the world."

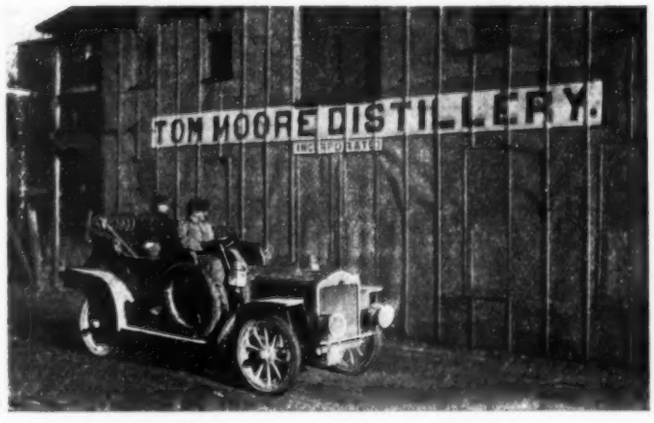
A Visit to the Famous Mammoth Cave.

The next morning, after 18 miles of bad going on the main north and south route, we came to Cave City. Here we left the main road and traveled over 12 miles of as bad road as I ever saw when we reached the cave. If it were not that we were told that the road is fairly good in summer, I could not conscientiously recommend this detour to any one. We were 3 1-2 hours in traveling the 30 miles between Canmer and the cave. Here we spent all told about three hours. The guide book says that there are 152 miles of avenues and grottoes in the cave. Visitors come from all over the world and spend days and weeks in exploring the place. As for our party, we all preferred traveling on the pikes, and we were satisfied to walk in for a mile or so and then turn around and walk right out again.

Then came 11 miles more of miserable road before we regained the main road at Glasgow Junction. From here we had an easy 24-mile drive to Bowling Green, where we spent the night. In this town the Confederate forces went through the formalities of installing a State government in the first year of the war, the members of which were promptly driven out by the Union sympathizers from other parts of the State.

ACQUAINTING HORSE AND AUTO—AND ALSO OTHERS.

IN THE CENTER OF THE HUSTLING VILLAGE.



"WHAT'S IN A NAME?"—WILLIAM SHAKESPEARE.

THE ROAD BETWEEN CAVE CITY AND MAMMOTH CAVE.

HENRY CLAY HOMESTEAD NEAR LEXINGTON.

LOOKE MONUMENT AT FRANKFORT.

ONE OF THE TYPICAL SOUTHERN MANSIONS.

From Bowling Green there is a direct and unmistakable pike right through to Nashville. Thirty miles from Bowling Green we crossed the line into Tennessee and left Kentucky behind us. Kentucky is a fine State; if poverty has any place there, it did not lurk near the roads where we traveled. Everywhere the land shows evidence of great fertility and the crops of tobacco and grain bring profitable prices. The houses in the country are substantial and comfortable, and there seems to be a fine saddle horse for every member of every family. Kentucky has many miles of fine road, and there has been no more gratifying feature of my trip than to see the evidences of projected road improvement work in almost every part of the State.

So far we have seen very little of the State of Tennessee—less than 40 miles. But as soon as we crossed the State line from Kentucky we noted a difference in conditions. The fields were not so carefully cultivated, there were broken-down rail fences instead of wire fences, and there were no bridges over the small streams. However, we had 15 miles of fine macadam into Nashville, and I will "suspend judgment" on Tennessee for the present.

A touring party, following the route which I have outlined above, would probably find it best to observe about this schedule: First day, Columbus to Cincinnati; second day, Cincinnati to Lexington; third day, Lexington to Louisville; fourth day (if early start is made), Louisville to Mammoth Cave; fifth day, Mammoth Cave to Nashville. While we spent two nights on the road between Louisville and Nashville, we had but a half day's traveling on the first day and the same amount on the third day. It is a reasonable assumption that the roads will be in better condition in the touring season than they are at present.

This is no country, however, for fragile machines or inexperienced drivers. There are no garages every five or ten miles as there are in New York and New England, and the touring party must be absolutely independent of outside aid. Finally, this is not a country for the scorchers—the roads are too rough for speed, and furthermore, the tourist must be prepared to stop his car and engine to allow horses and mules to pass by. To the trained tourist, who is looking for novelty, who is satisfied to cover an average of from 90 to 100 miles a day, who is considerate of the rights of other users of the highway, Kentucky extends the hand of welcome.

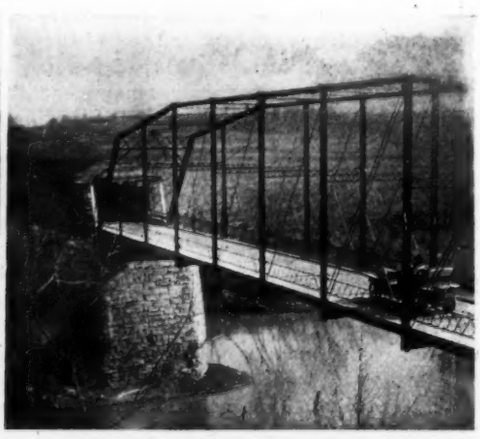
FOREIGN CARS COMING FOR NEW YORK-PARIS.

Foreign contestants have already commenced a journey which will not end, if all expectations are realized, until the automobile has put a girdle round the globe. Cable announcement from Paris is to the effect that the Brixia-Zust, one of the Italian contestants, has reached the French capital under its own power and will be shipped for New York next Saturday on the *Lorraine*. On its journey it was joined by the Motobloc, built at Bordeaux, and ran with that machine until the city boulevards were reached. Crowds in the streets became so dense that traffic was disorganized and the police were obliged to order the two automobiles to quit the stand they had taken opposite the *Matin* office.

There will be three cars on the *Lorraine*, due to arrive at New York on February 8, the number being made up of the Brixia-Zust, from Italy; a De Dion, and a Motobloc, from France. The only German participant, the Protos, will arrive one day later on the *Kaiserin Auguste Victoria*, having been shipped direct from Hamburg.

THE NEW STATE HOUSE AT FRANKFORT, KY.

CANDIDATE W. J. BRYAN AND PATHFINDER JOHNSTON.



A BRIDGE COMBINING NEW AND OLD TYPES.

SOME POINTERS FOR THE TROUBLE HUNTER

By CHARLES B. HAYWARD.

IN one or two instances, so-called authorities on the subject have been at pains to prepare a list of all the principal ailments that can afflict the automobile in one form or another. Seldom, if ever, has the compiler made any attempt to include *all* the things that can possibly happen to a car, and in view of the extreme rarity of many forms of ailments, the futility of even attempting to complete such a compilation must be manifest. Hence, only the principal defections of more or less common occurrence are usually included in such lists, though the impression made by their length is more than sufficient to suggest that a fine-tooth comb had been conscientiously employed in the process and that many an unknown disease has been brought to light for no other purpose than to show that it exists, and incidentally to swell the list. The feelings of the new owner of a car when he has an opportunity, for the first time, to survey such a list, are akin to those of the layman upon getting his initial glance at the interior of a medical work which gives him a faint idea of the truly wonderful variety of diseases that humanity is heir to. Whether gazing over a list of automobile ailments is apt to inspire thoughts of a nature akin to those of the average man who sees a remarkable coincidence between the symptoms described and his own, in almost every case, and thus make of the autoist a hypochondriac by proxy, is a question the answer to which inclines toward the latter view, for when hunting trouble that baffles discovery few clues are too slight to be followed and a long list is a most prolific source of inspiration.

If the beginner will observe the experienced trouble hunter round an automobile—particularly those who have achieved a reputation as wizards of their craft, he will not be forcibly impressed with any apparent following out of a well-defined system of searching for the cause of the ailment. On the contrary, it will appear as if the searcher jumped aimlessly from one thing to another, and frequently had scant idea of what to tackle next after his preliminary ministrations had failed of their anticipated effect. Of course, it is mighty disappointing when you have fully made up your mind that the carbureter is at fault and its malady is of a certain well-defined nature, such as a plugged-up jet, or a leaky float, for instance, to find that no such thing exists. "Well, then, it must be the ignition" may be the conclusion, and when a thorough examination reveals nothing wrong there, the amateur searcher all too frequently considers himself at the end of his resources.

System May Be a Valuable Aid.

Following out a set system of searching for trouble may constitute either an almost certain method of finding what is so eagerly sought, or quite the contrary, a means of wasting much valuable time and effort, with the sole final result of utterly disgusting the searcher with his task. Some of the lists referred to at the opening of this article would, if closely followed, be more than apt to have this result, from which it will be quite apparent that everything depends upon the system. It may seem that the average repairman in a garage goes aimlessly to work in looking for trouble round an engine, but a closer study of the methods employed in a large number of instances will reveal the fact that most of such men, where they have had considerable experience, have developed a system of their own. Practically every autoist does the same. In childhood, we learn most things that are beyond us purely by rote, and our only authority for the existence of a certain state of facts is the book. In the same way the new owner of a car looks to his "little book," but with the knowledge gained from even a short experience such aids are discarded in favor of the teachings of the latter.

Probably there are few autoists to-day who, in the inception of their careers as such, did not place considerable store by the written word as expressed in the works of numerous authors on the maladies of the automobile, and who, before taking their first plunge, carefully primed themselves in advance with sufficient information to start a dozen balky engines. Strange to relate, though, it proved the hardest thing in the world to apply the knowledge thus gained to the matter in hand, and while everything seemed most beautifully clear as elucidated by the author with the aid of numerous illustrations and easy technical descriptions, the book might as well have been a work on the "infinitesimal interim" as on the automobile, so far as its help went in aiding the beginner when confronted with the reality. Not that it is desired to run down a book, or books in general, but merely to point out that their value is only appreciated to its full on a second or third reading in the light of experience gained during the intervals. It is difficult to appreciate anything that is not understood.

Make a Study of Cause and Effect.

Modern medicine does not direct its efforts half so much to the cure of the actual ailment as it does to the removal of the underlying cause, and the autoist who wishes to attain to that degree of knowledge where no defection of the motor, regardless of how puzzling it may appear, is sufficient to "stump" him, will do well to bear the fact in mind that there is always a direct and important relation between cause and effect in every stoppage of a gasoline motor. An engine that refuses to start from cold does not offer as good a subject for diagnosis, or the study of cause and effect as does one that has come to an apparently inexplicable stop while on the road. In other words, there is something to be learned from the manner in which the motor stops. A sudden and abrupt failure to fire may almost invariably be traced to the ignition system and just as forcibly points to a lack of current. But no battery "dies" suddenly, so that it stands to reason that a short-circuit or an open circuit, more often the latter and caused by the breaking of a wire or a connection, is responsible for the trouble.

Spasmodic and gradually weakening operation is most often due to a failing battery, or what is its practical equivalent so far as results are concerned, the gradual working out of adjustment of coil tremblers that have become loosened. This parallel is most often true of single and twin-cylinder engines, as the chances of all four tremblers of a four-unit coil getting out of adjustment in the same manner simultaneously is remote, but the resemblance between the two is so great that I have known more than one good set of dry cells to be thrown away for no other cause than that the poor adjustment of the tremblers caused every symptom of an exhausted battery to appear. A timer that has degenerated to a state where it only functions in an erratic manner, at times performing in a normal way for several minutes and then doing all sorts of "stunts," is also productive of symptoms that are frequently thought to emanate from the weakness of the source of current supply, or a gradually diminishing gasoline reserve. In connection with the latter there are most peculiar indications to record.

The last drop always tastes sweetest when there is no more to be had, and this seems to be the case with the gasoline motor as it runs so very well on the few last drops of fuel that a suspicion of impending disaster is furthest from the

mind of the driver. Just why a motor should stop suddenly when running at its best is naturally far more puzzling than where it gives up the ghost only after a more or less prolonged struggle against adverse conditions, and I have known more than one autoist to ardently wish that he could so adjust the carbureter of his motor to give results equal to those that it produces on the last remains of the fuel in the tank. But there is something different about the manner in which the motor stops from lack of fuel after giving this final spurt, and that of its sudden cessation of operation caused by a break in the ignition system—something that experience gives the ability to detect, as is true of so many other things.

Getting the Symptoms Confused.

It would be bad for the patient if doctors erred or disagreed in their diagnoses half as often as even the more experienced autoist does in his conclusion as to the cause of the malady, one instance that comes to mind at the moment being a case where the improper running of the motor was put down to the carbureter and every possible means of changing the adjustment of the latter having been resorted to without favorable result, its replacement was seriously considered. So firmly had the victim of the trouble become convinced that the carbureter and nothing else was at fault that it was only upon being shown by actual demonstration that the timer was responsible that he changed his opinion. As the car was of the light runabout type, selling at a low price, the device in question was not of a high order of efficiency, and experience with it on a number of the same cars had shown it to be afflicted with a chronic ailment inseparable from age and which was all too frequently put down to some other cause. This merely consisted of a weakening of the contact springs which so delayed the occurrence of the spark in the combustion chamber that the effect was the same as if the ignition had been retarded to an extreme.

In this connection it is well to remark before going any further, that the timer is very often responsible for the poor performance of the motor, or its stoppage, where the carbureter is blamed. The latter is a thing of mystery at times —even to the thoroughly initiated, and practically always to the beginner, so that it may seem more natural to suspect it than something simpler and more tangible, such as the timer invariably proves to be, for it must either work or fail while the carbureter has many intermediate stages of defection. In one instance that came to light a year or two ago the failure of this essential of the ignition system would have been responsible for the almost entire dismantling of the motor's accessories had it not been discovered in time—and time in this instance meant several hours of wearisome trying this, that and the other, a large part of which was lavished on the carbureter and its auxiliaries. It would be useless to attempt to detail the manner in which this long search was carried out or the endless number of expedients resorted to in trying to discover the trouble, which was finally found to consist of nothing more or less than a loose set screw.

The function of the latter was to hold to the timer on its vertical shaft, a recess in the latter being made for its reception. Owing to the vibration, or some other unexplained cause, the screw had backed out of this countersunk recess just sufficiently to hold at times and let go at others, with the added peculiarity that it always permitted itself to be picked up by the shaft when turning slowly, so that there was little or no difficulty in starting the motor by cranking, no matter how often it stopped. Its periods of continued running varied from one to two minutes to almost half an hour, being punctuated at times by sudden stops and equally sudden resumptions of action, caused by the timer being picked up again before the motor had lost its momentum, so that it automatically took up its cycle again. In the same way the ignition has been blamed for a miss that was finally traced to a leaking inlet valve which had never been suspected.

As was the case in one of the instances already related, where study of the problem revealed the fact that half a dollar's worth of new timer springs were needed instead of the fifteen dollars' worth of new carbureter that the troubled owner had seriously considered investing in, a little reflection which takes into account all the phases of the matter will frequently not only lead to the discovery of the cause itself, but likewise result in a saving of considerable expense. Experience in giving "absent treatment" to a large number of cases, in other words, advising troubled owners at long range as to the cause of trouble with their cars, has shown that the average autoist is prone to overlook the fact entirely that the devices which are now apparently the cause of so much worry once gave satisfactory service and that for a long period. Failure to remedy the trouble by ordinary means seems to give rise to an insatiable desire to buy new parts or to go to other extremes of expenditure.

If the design or construction of the car were so radically wrong that nothing but a replacement or a redesigning of the part in question would suffice, which some of the owners in question seriously contemplate when confronted with defections of a nature apparently irremediable otherwise, how did the car ever come to give satisfactory service in the first place? Of course, it is a matter of common knowledge that most of the productions of earlier vintage embodied defects of design and construction of one form or another, and that it is possible to greatly improve such cars by redesigning some of their parts in accordance with what has come to be standard practice since they were first turned out.

A Little Reflection Will Help.

No one is in a position to know the history of a car so well as the man who has owned and driven it for two or three years, and it seems strange that in the light of the knowledge gained in this manner, that such owners should not reflect that what has given long-continued satisfactory service cannot be made to do so again by proper adjustment or repair. One of the things that is not taken at its full value is the effect of wear on moving parts. Take the wear on valve-operating mechanism as an example; it involves a dozen or more contacting surfaces, loss of metal from which tends to decrease the maximum valve lift and to hasten its closing, the only compensation for which is to be found in the lowering of the valve seat itself by grinding, so that after three or four years' use the valve timing is almost wholly deranged. Checking up the flywheel marking should reveal this.

Trouble has at times been traced to a combination of causes in which both the carbureter and the ignition system were contributors of the greatest importance, where failure of the motor to perform satisfactorily was concerned, and where completely remedying one did not prove effective for obvious reasons. But to go further into detail under the head of what might be termed complications, or, for that matter, any of the subdivisions which have been dwelt upon without any regard to a well-defined sequence, would require a volume.

In all motor trouble, and this comprises more than 75 per cent. of all the ills to which a car is subject to, barring tires. it should be borne in mind that a proper fuel mixture ignited at anything near the proper moment will give some evidence of its presence, and that where the motor will not produce so much as a "cough" under the most long drawn out and skillful ministrations, it has not "gone bad," nor is it "balky," or "hoodooed," or any of the other numerous bad things attributed to it by its puzzled owner. It simply means that one or the other, or both, of these cardinal necessities is not present in a form even remotely approaching that required for operation as the possible range of mixture composition and ignition timing under which a motor will show some signs of life is very great.

LETTERS INTERESTING AND INSTRUCTIVE

BALANCE OF FOUR AND TWO-CYCLE MOTORS.

Editor THE AUTOMOBILE:

[1,133.]—Kindly give your explanation of combustion balance as applied to four and two-cycle motors. G. GRANT.

Bryn Mawr, Pa.

By combustion balance we presume you mean the balancing of the impulses of the motor, as distinguished from its purely mechanical balance, which has reference alone to the parts in motion. In comparing the two types of motors, it may be assumed that a four-cylinder motor is supposed in each case, as this gives the best balance attainable in the four-cycle motor, short of six cylinders. As you are doubtless aware, the pistons of the four-cylinder, four-cycle motor are placed in two groups of two each, the crank throws being arranged at an angle of 180 degrees, a typical arrangement being that in which two pistons in the same plane are placed at opposite ends of the shaft, while the other pair is between them. The impulse stroke of cylinder number one will then be balanced by the compression stroke of cylinder number three, which fires next and is balanced by the compression stroke of number two, the firing of the latter, which is next in order, being balanced by number four, and this in turn by number one, then repeating.

In the two-cycle motor of the same number of cylinders, there is no reason why they cannot fire one, two, three, four, thus permitting the use of a four-throw crankshaft with the cranks set at 90 degrees to one another round the crank-circle, and we believe this is the case in most four-cylinder, two-cycle engines. In other words, the motor of this type is practically the same as the single-acting steam engine, the only idle stroke being that of compression, the impulses thus being distributed much more evenly round the crank-circle than is the case with the four-cycle.

ENAMEL VERSUS PAINT ON A CAR.

Editor THE AUTOMOBILE:

[1,134.]—There is so much trouble attached to the preservation and maintenance of the finish on the poorly-painted automobile and so much expense attached to the production of a really durable and high quality coach finish, that I have often wondered what objection there could be to the use of bicycle enamel on metal bodies at any rate. As all of us who had wheels will remember, these enamel finishes clung to the steel and presented a new appearance for an indefinite period under conditions of the hardest service. I always have understood that these enamels were applied simply by dipping and baking, without any precautions in the way of a multitude of coats or grinding down with pumice and rottenstone to produce a polish. So why are not enamels used on automobiles? CLARENCE N. STUTTS.

Paducah, Ky.

We know of no reason why enamel should not be extensively used in the manner you mention, and, though without specific information that this is the case, we believe that several manufacturers employ enamel instead of paint. Its use undoubtedly is limited, however, by the considerable plant required for its proper application. Enamel cannot, as you suggest, be satisfactorily put on with a brush, but is best applied by dipping—a process that involves enormous tanks and large stocks of material for anything so large as an automobile body. And, besides the tanks, there are required ovens of similar magnitude, equipped with means for heating, and the maintenance of the temperature with only a minimum variation for many hours at a time. Undoubtedly enameling processes will come more and more into vogue as standardization progresses, unless there are objections to it with which we are not familiar. On this score, as well as on that of its present application, we shall be pleased to give space to anything that our friends in the trade may be interested enough to communicate to us.

EXHAUSTING ONE CYLINDER ON THE INTAKE.

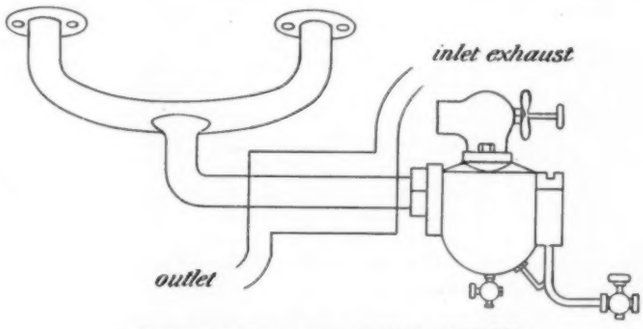
Editor THE AUTOMOBILE:

[1,135.]—Would you kindly inform me through "Letters Interesting and Instructive" as to whether I would gain anything by inclosing the pipe leading from the carbureter to the manifold through a sleeve and exhausting one cylinder through the sleeve, as per sketch. Have noticed slight popping noise at carbureter, especially at high speed. Carbureter is a Schebler and is new.

My spark plugs are wired through a single coil with a single wire running to the timer from the coil, thus causing both plugs to spark simultaneously. Would I improve matters by putting in a two-unit coil and a two-point timer? J. L. DAVIS.

San Francisco, Cal.

We should hardly recommend such an arrangement as that illustrated by your sketch, which we are reproducing herewith. The amount of heat required for this purpose would not necessitate the direct use of the exhaust gases from even one cylinder. Instead of placing a sleeve such as you indicate round the intake, make one of a similar type to encircle the exhaust manifold and lead a somewhat large bore pipe from it to the vicinity of the carbureter, having it end in a bell-mouth so that it will discharge hot air on or against the carbureter itself. This may be found to prove an advantage, but such a very great number of cars run



PROPOSED HEATER FOR INTAKE MANIFOLD.

satisfactorily without any provision whatever for warming the carbureter, either by hot air or water, that unless good running cannot be obtained in any other way, it would seem hardly necessary to go to this trouble. The bonnet of the modern car is so tightly inclosed that the air under it is pretty warm at all times when the motor is running. The popping noise at the carbureter is usually caused by a weak mixture, which burns so slowly in the motor that it is still afire or under considerable pressure when the intake valve opens for the succeeding charge.

The ignition of the motor would doubtless be improved either by the retention of the single coil and the fitting of a combined two-point timer and distributor, or the use of a two-unit coil and two-point timer, although motors fitted as you state have often been run for a considerable period without great trouble.

WHAT IS THE CAUSE OF THIS KNOCK?

Editor THE AUTOMOBILE:

[1,136.]—I would greatly appreciate your help in finding the cause for a knock in my two-cycle automobile engine. When I start out it seems to pull quite well for a short time, but soon, on a slight grade, begins to knock if I advance the spark or not, and it seems to do best if I keep the throttle about 1-4 open and advance the spark some. I am pretty well satisfied that the bearings are snug and it seems to me like a premature explosion. The only thing I can think of is that there is something wrong with the cooling system. I have drained the water off several times and had one repairer go over the water circulation. How shall I clean it if you think that is the cause? I have had one cylinder off and did not find much carbon. I can feel that the engine has power until this

aggravating knock occurs. I cannot adjust my carbureter (a Schebler) so that the engine will run well with the throttle open and the spark retarded, especially when the car is standing still. Would a stoppage in the gasoline supply account for this? How can I tell if the flow is sufficient? If I open the cock under the carbureter while the engine is running wide open, should the gasoline still run out? The engine has automatic inlet valves.

Oakland, Cal. A SUBSCRIBER.

If your statement that the bearings are snug could be regarded as true beyond a question, there might be some mystery in the knock you speak of, or as you say, it might be due to preignition, but from the remainder of your statement of facts there appears to be little doubt that it is cursed by loose bearings—either in the wrist-pins or the connecting rod big-ends. The fact that the motor runs smoothly under no load, or a very light load, and immediately begins to make a knocking sound the moment a load is applied, is an almost certain indication of this, as a motor that is afflicted with a bad case of preignition will show the symptoms of its malady, even when running light.

It is far from desirable to run a motor with the throttle open and the spark retarded; the time of ignition should always be advanced as the fuel supply increases, otherwise there is not sufficient time for the proper utilization of all that is admitted and more or less back pressure is created, due to the fact that the charge is apt to continue burning after the exhaust valve is closed. If the motor will perform well at normal speed when hill climbing, that is, without missing, the gasoline supply is sufficient.

Failure of gasoline to run out of the cock at the bottom of the carbureter would merely be an indication that there was none in it, regardless of whether the engine was running or not, though if such were the case the engine would certainly not be running. The fact that the motor is equipped with automatic valves is somewhat at variance with your statement that it is a two-cycle, unless you refer to the ports or the check valves of the two-cycle type.

USING THE MOTOR FOR BRAKING.

Editor THE AUTOMOBILE:

[1,137.]—What is the best way of using a motor for a brake? This is a point, I am sure, which merits a good deal of discussion, for it undoubtedly is the fact that many otherwise competent drivers wear down the friction surfaces of the brakes, when a little knowledge of how to handle the motor in such a case would place at their disposal a ready means of retarding the car on long descents without burning up or overheating the brakes proper. The things I most particularly wish to know are: Is the greatest retarding effect secured with the throttle opened or closed? Should the ignition be switched off or not? And under what circumstances should the engine be driven by the car through the lower gears? With the throttle closed so little air is drawn in that the resulting vacuum must, by sucking the piston back on the next stroke, return a good deal of the power that had been absorbed. On the other hand, with the throttle wide open, full charges are inspired so a heavy retarding effect must be produced by the compression, but is not this nullified by the expansion in the succeeding stroke? These considerations make it difficult for me to figure out just what is best. I also would like to be told of some way to save the fuel while using the engine as a brake, for even though the ignition be cut out, the fuel must go through and be thrown away at a rate corresponding with the throttle opening. ELMER WILLARD.

Dubuque, Ia.

Parts of your letter make it appear that you forget the cylinder of a four-cycle engine functions through a cycle of four operations just the same whether the ignition is off or on. Thus, with the throttle wide open, there is suction, compression, expansion, and exhaust, with the chief resistance in the compression stroke, and this resistance largely nullified by the immediately ensuing expansion which returns much of the power required for the compression. With the throttle nearly closed, there still are suction, expansion, and exhaust, with a resistance due to the production of a partial vacuum during both suction and expansion strokes, which is only partially nullified by the atmospheric pressure behind the piston during what would be the compression stroke had full charges been inspired. It follows, therefore, that an ordinary four-cycle motor gives a maximum braking effect when turned over against a closed throttle—a plan that further recommends itself through possessing the incidental virtue of saving fuel. Moreover, this being the case, it is not necessary to switch off the ignition, except to save current, provided, of course, that the fuel supply can be cut off completely. With a two-cycle motor, the conditions are different, and whether the throttle is closed or open, the suction in the one case and the compression in the other, tend to return the power that produced them, thus leaving only the friction, leakage, and heat losses, etc., to produce the desired retardation. The ideal way of using a motor for braking, though it probably would be objectionable practically, because of its complication, would be to have an extra valve mechanism that could be brought into action to the exclusion of the regular valve mechanism, and which would permit compression during each stroke and suction during each down stroke. As for the matter of gears, of course, by engaging a lower gear the car must turn the engine over faster than is required with a higher gear, in this way, opposing the greatest possible resistance to the car's motion. Very few cars will coast very fast no matter how steep the grade with the low gear in mesh and the clutch engaged and the engine dead. For cutting out the ignition, the usual method is simply to switch off the current at the regular switch. A rather more convenient way is to have a special cutout, placed so as to be conveniently operated by hand or foot.

TO GIVE BRASS AN ATTRACTIVE DULL FINISH.

Editor THE AUTOMOBILE:

[1,138.]—In a copy of "The Automobile," which I have lost, there was a formula to change brass to a blue or green metal finish. Will this wear and stay as you color the brass, or will you have to keep giving it a coat to retain that finish? Will you kindly put the formula in your next issue? OMER M. SLOAT.

Worcester, N. Y.

To color brass a bluish black, make a solution composed of 15 parts nitric acid, 8 parts cupric sulphate, 20 parts alcohol and 12 parts water. Clean the metal thoroughly and remove every trace of grease, which may be done by dipping in a pickling solution composed of 10 parts sulphuric acid and 90 parts water, afterward rinsing clean in running water. Spread the above solution over the metal, then dry and rub with a clean rag, preferably linen. This is but one of a great number of such formulæ for coloring metal, but it is doubtful if any of them give permanently satisfactory results. It is our impression that the latter are really only obtainable by electrolytic processes and that it would be more economical and certainly more satisfactory in the end to send lamps or similar parts to be given a dull finish to the electroplater.

STRANGE CASE OF UNEVEN WEAR OF GEARS.

Editor THE AUTOMOBILE:

[1,139.]—I am sending you under separate cover a gear that came out of the differential case of my Pope-Tribune Model 5. You will see this gear is badly worn on one end, while the other end is not worn away. The three gears that mesh into the left-hand axle are all worn like sample, while the other three are not worn any. The car has been run about 4,000 miles. Everything about the rear axle except these three gears is in good condition. What would cause these gears to wear in this manner? J. R.

Claremont, N. H.

We are in receipt of the differential pinion to which you refer and must admit that the case is a puzzling one, without further information than the fact that the gears are worn as you state. We have inquired of the agents of the car in this city, but they do not recall ever having had a similar case. However, the cause of this one-sided wear can only be due to two things, acting either alone or in conjunction with one another. Either the load has been carried almost entirely on this side of the differential, or through some accident, the pinions in this side are of poorer material than those of the other, or, as already stated, both these causes may have been operative. The case is an interesting one,

and we should like to hear from any of our readers who have come across anything similar. The differential is the spur type commonly employed on low-priced American cars.

AUTOMOBILES FOR FREE RURAL DELIVERY.

Editor THE AUTOMOBILE:

[1,140.]—I am a subscriber and studious reader of your excellent journal, and would like to say a few words in your "Letters Interesting and Instructive." Why is it that there are not any machines designed and built for rural free deliveries use? I believe there would be a good demand for a good machine adapted for that special purpose. I have a plan for a machine of that sort, which has been pronounced by several as A 1, and would like to consult with some small manufacturers or some one contemplating automobile manufacturing. I have made this a special study for several months and sincerely believe this a good field for a good medium priced machine designed for that special purpose. DELBERT DARE.

South Bend, Ind.

There is no doubt that the free rural delivery service of the U. S. Mail forms a most excellent field for a light and medium-priced car capable of standing up under hard and continued service, and while there are a number of machines on the market which may be considered as coming within this classification, there is still room for competitive effort, as no great numbers of any one make of machine have been adopted, either by individual carriers or by the Government. The postal officials of the latter in charge of this department, have, however, been doing considerable experimenting along these lines, and successful trials of small air-cooled machines have been made during the last year or two. These have led to the official adoption of several cars, but there is a tremendous field for automobiles of this type, not alone in the government service, but for the farmer and others living in the rural districts. You will find the announcements of quite a number of builders of small cars in our advertising columns, and we should recommend your getting in touch with them by correspondence in furtherance of your plans.

A MOST PECULIAR CASE OF TROUBLE.

Editor THE AUTOMOBILE:

[1,141.]—I have a two-cylinder 11-horsepower two-cycle engine in a 21-foot boat which makes about eighteen miles per hour. I used it all last summer, and at the end of the season I had some peculiar trouble with the spark plugs in the rear cylinder. As soon as I would advance the spark and speed up the engine the plug would get so hot that the metal point on the end of the mica center would melt off and the rest of the plug would blow out of the cylinder, while the cylinder would remain cool. This happened to four mica plugs. When I tried a porcelain plug the plug would get so hot that the cylinder would fire at the wrong time. I had this trouble with the rear cylinder only. Can you tell me where to look for the trouble? Thanking you in advance,

Utica, N. Y. TWO-CYCLE.

We must admit that no case in any way similar to this has ever come to our attention before and we would not even venture to suggest an explanation any more out of the ordinary than that of a failure of the cooling water to circulate through the jacket of the cylinder in question. This would appear to be such a commonplace cause of the trouble and one so readily detected by anyone familiar with such motors that we presume it has been taken into consideration. We would, therefore, refer the query to the attention of our readers, confident that some one of them can doubtless give a better reason should the foregoing not have been the cause.

CONCERNING EXHAUST VALVE TIMING.

Editor THE AUTOMOBILE:

[1,142.]—Will you kindly give in your next issue of "The Automobile" the number of degrees the crank should have traveled when the exhaust valve should commence to open; also the position of crank when it is closed; what is the position in degrees when the intake opens and closes when mechanically operated? A. I. Q.

Swampscott, Mass.

We believe it is customary in American practice to have the exhaust valve open about 30 to 35 degrees on the crankcircle in advance of the lower dead center, and have it close again either when the crank is exactly at the upper dead center or 3 to 5 degrees beyond it. The intake valve is set to open at the same time as the exhaust valve closes and remains open until the crank has passed the lower dead center some 15 to 20 degrees on the crankcircle. This is termed the lead given the valves, and its extent depends to a large measure upon the speed of the motor, its function being to insure the scavenging of the combustion chamber in the case of the exhaust and the aspiration of as full a charge as possible in the case of the intake.

THE POSITION OF AUTO HEADLIGHTS.

Editor THE AUTOMOBILE:

[1,143.]—Some years ago I read a suggestion to the effect that automobile searchlights could with advantage be carried as high on a car as practicable, even to the extent of placing them immediately beneath the forward end of canopy tops. The argument for this was that the higher the lamp the better the illumination is thrown into the small hollows and irregularities of the road. Since then I have seen a number of searchlights thus carried on canopy-top cars, besides the now common mounting on the dashboard. It has struck me that the same idea might be with advantage applied to the placing of the ordinary turn headlights, which, as usually mounted, throw their beams so low as to make every small inequality appear like a yawning pit, because of the intensely black shadow it casts. Has it never been attempted to mount these lamps higher—on the sides of the radiator, say—and does any one sell fixtures or brackets capable of being thus employed? And what merit do you think there is in the whole idea, and what, if any, are the objections to it? ARNOLD WRIGLEY.

Chattanooga, Tenn.

While your suggestion is not, as you point out, altogether new, it certainly seems to merit the consideration of lamp makers, car builders and users generally. There is no question but that the very low position of many lamps largely discounts their practical value in the manner you mention, despite the provision of ample illuminating power. Some manufacturers, however, are evincing a tendency to mount the front lamps on very high brackets, and in at least one case—that of the Northern cars—the headlights are bracketed on the substantial front ends of the forward fenders, a placing that seems more desirable than your idea of brackets on the radiators. We shall be pleased to hear what, if anything, any one may have against these suggestions.

DIFFERENCE BETWEEN LIVE AND DEAD AXLES.

Editor THE AUTOMOBILE:

[1,144.]—What is a live axle and what is a dead one? Also difference between floating and live axle, if any? MPLS.

Minneapolis, Minn.

A live axle is one that is utilized to drive the car, in other words, a moving axle, while a dead axle remains inert. The former type is employed on shaft-driven cars on which the power is transmitted to the driving wheels through the live axle, while the second type, or dead axle, is a feature of double side-chain driven cars in which the axle does not move in connection with the driving of the car. There is no difference between a floating and a live axle, generally speaking. The former term is used because what are known as the driving shafts of a live axle, i. e., the two halves which extend from the differential to the two driving wheels are not firmly bound at either end. They are usually held by jaw or similar clutches at either end, so that they may be literally said to float, hence the term.

GAS IS WHAT PRODUCES THE HEAT.

Editor THE AUTOMOBILE:

[1,145.]—Will you please let me know through your columns which will heat a motor most, too much air through the carbureter or too much gas? F. S. P.

A slow-burning mixture, by which is meant one that contains either too little gas or too much gas, is apt to over-

heat the motor, but of the two the latter is naturally by far the worst, as it is the burning of the gas that produces the heat. As long as there is sufficient air to burn the gas, the more of the latter there is the more heat will be produced. But the overheating is not due so much to the fact that more heat is produced, as that, in the case of the slow-burning rich mixture, the heat is not utilized, a far larger percentage of it going to the cylinder walls and other parts of the motor. Probably the over-rich mixture does not produce as many heat units as the correct mixture would, but those of the latter are quickly utilized and the waste as quickly disposed of, from which it will be apparent that it is really the time element that is of the greatest importance.

INTERESTED IN DAIMLER DRIVER'S CERTIFICATE

Editor THE AUTOMOBILE:

[1,146.]—Will you kindly inform me through the columns of your journal if you know of a chauffeur's certificate given by the Daimler Company to men who pass an examination under their supervision? If so, kindly state where information can be obtained in regard to the conditions. H. HUBBERSTEY.
New York.

We are not aware of any chauffeur's certificate granted by the German Daimler firm. The British Daimler Company has recently inaugurated a scholarship scheme the candidate chosen after examination being entitled to two years practical and theoretical training in their works and payment of $500 per annum. At the completion of the two years' term the holder of the scholarship may be retained in the company's works at a salary of not less than $750 per annum. There are also four minor scholarships granting the same facilities, but fixing payment at $100 per annum. A number of European firms train mechanic apprentices, but training of drivers is now rarely undertaken by the factories.

WILL MR. DURYEA PLEASE OBLIGE?

Editor THE AUTOMOBILE:

[1,147.]—I want some information about the first public competition in a race of cars in the United States. I believe it was held in Chicago and that a Duryea won. I am not positive, however, and if you could tell me how many cars participated, how long the course was, and the time, I would be very much pleased. Your paper is fine and I couldn't get along without it.
Milton, Pa. MYRON L. DICKSON.

As Charles E. Duryea, of Reading, Pa., now consulting engineer of the American Motor Car Manufacturers' Association, was the winner of the race in question in a car of his own design and build, we should prefer to have him give the facts, which we have no doubt he will supply us with for publication in a forthcoming issue.

TO SOFTEN AND PRESERVE LEATHER.

Editor THE AUTOMOBILE:

[1,148.]—Will you kindly give me a receipt for softening and preserving leather, color dark red. G. R. FERNALD.
Wilton, Me.

Wash the leather with a little soft soap and warm water, wiping it thoroughly dry. Then prepare a dressing composed of lard, 100 parts; castor oil, 20 parts; yellow wax, 25 parts, and white vaseline, 30 parts. The latter is given in a general collection of such formulæ, and we cannot guarantee its efficacy. Any reader who knows of a better one with which he has personal experience in applying to the upholstery of his car, may give it in these columns, if he wishes to do so.

INFORMATION WANTED CONCERNING DRY CELLS.

Editor THE AUTOMOBILE:

[1,149.]—Among your letters note particularly No. 1,090, regarding dry cells. I second the latter part concerning reprinting Mr. Jackson's letter, being a new subscriber who has had much trouble with ignition; cannot use anything but dry cells, as I have no facilities for recharging storage batteries. A. R. JACOBS.
Dillon, Mont.

Mr. Jackson's article concerning the use of the dry cell appeared in the issue of THE AUTOMOBILE of May 23, 1908, of which copy will be forwarded upon request.

FOR MR. MUNCH HAUSEN TO DIGEST.

Editor THE AUTOMOBILE:

[1,150.]—Possibly the solution of my experience in the matter of consumption of cylinder oil may be of interest to the writer of letter No. 1,109, published in your issue of January 16. During the past two years I have driven a Rambler Type 2 machine (double-opposed cylinder, 5-inch bore, 6-inch stroke) 3,744 miles with a total consumption (crankcase and cylinders) of seven gallons of cylinder oil—an average consumption of one gallon of oil for each 535-mile run, using round numbers. The engine is now and has always been in perfect condition. C. J. W.
East Acton, Mass.

Editor THE AUTOMOBILE:

[1,151.]—In your issue of January 16, M. H., of New York, doubts the statement of J. G. C., of East Orange, as to his averaging 381.09 miles on one gallon of oil. Although that is a fine average on that quantity of oil, it is a well-known fact that a great many cars of 20 horsepower are doing at least 100 miles on two quarts of oil all the year round. And I personally know of a certain make of car of 14 horsepower that uses only one quart for 100 miles, so I think that J. G. C. has made no error in his statement. W. A. FOSDICK.
Dallas, Tex.

AGREES WITH DIAGNOSIS OF VIBRATION.

Editor THE AUTOMOBILE:

[1,152.]—In your column "Letters Interesting and Instructive," in letter No. 1,097, on "A Problem in Vibration," you say, if your idea is right, on a back-handed motor the vibration should be greater. I will say that I have noticed the same thing on the cars that I drive. Am at present working on four or five Stearns and a couple of Oldsmobiles. The Stearns are back-handed motors and the vibrations are always greater an the left-hand side than the other, while the Oldsmobiles, being the opposite, the vibration is on the right. The Stearns are chain driven and the Oldsmobile shaft driven. I have often noticed the fact of the greater vibration, but until I saw this article I never gave it much thought.
Montello, Mass. JAMES E. FAUNCE.

HERE'S A CHANCE FOR THE A. A. A. LAW BOARD.

Editor THE AUTOMOBILE:

[1,153.]—I have just received a copy of the rules and regulations of the National Park in Wyoming, and I note that automobiles are absolutely prohibited from passing through the park. I am informed that the grades are fine, good and wide, and that there is no earthly excuse for excluding automobiles. The season opens about July 1, and, if enough influence is brought to bear with the Secretary of the Interior, these rules can be rescinded.

If your journal wants to receive the everlasting gratitude of a large number of autoists, this is a chance to get it.

Yosemite is open. C. P. THOMAS, M.D.
Spokane, Wash.

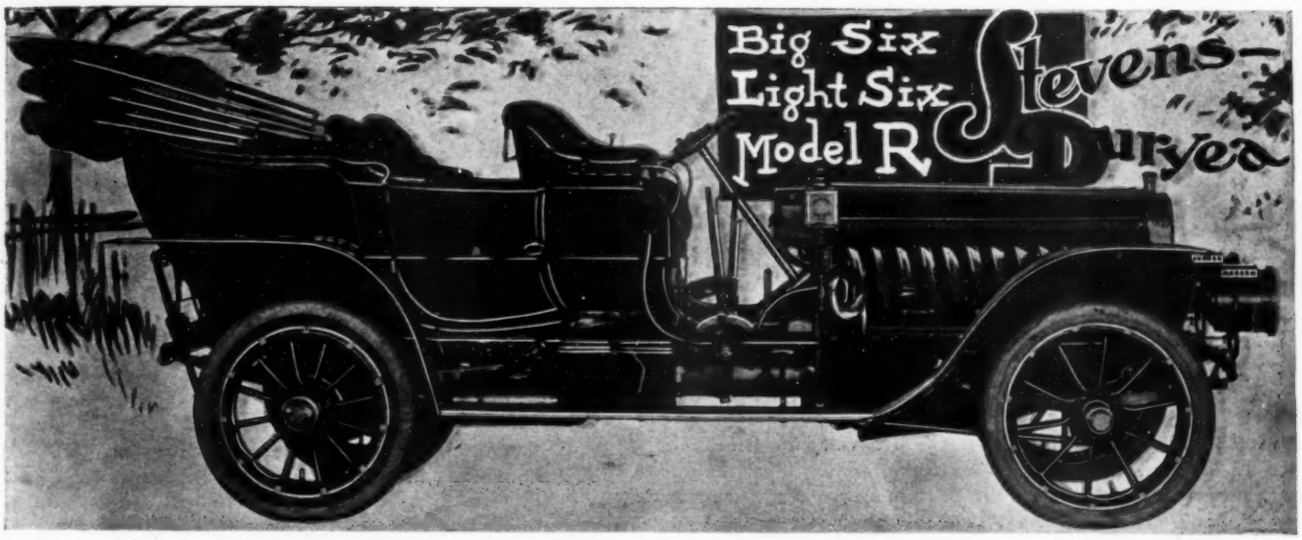
A FOUR-WHEEL DRIVE WITHOUT AXLES.

Editor THE AUTOMOBILE:

[1,154.]—I have noticed letters in "The Automobile" regarding a four-wheel drive, and am accordingly giving you a description of a car of this kind that I am now building. The car is built without axles, the wheels running in independent frames, making a more simple and durable form of construction. All four wheels are driven, the front truck turning to steer the vehicle. I am now using a 24-horsepower motor on the rear truck with a chain drive, but a gear drive is equally applicable. No differential is employed.
Reno, Nev. P. A. HELCHER.

FOR "INTERESTED READER, DETROIT, MICH."

If the correspondent who has contributed a letter to this department regarding the controversy between the advocates of the four and six-cylinder motors, signing it as given above, will make known his name and address, the letter will be printed in the usual course. This information is not wanted for publication, but merely as evidence of good faith. Names and addresses will never be published where a request is made to that effect, but no communications should be sent anonymously.

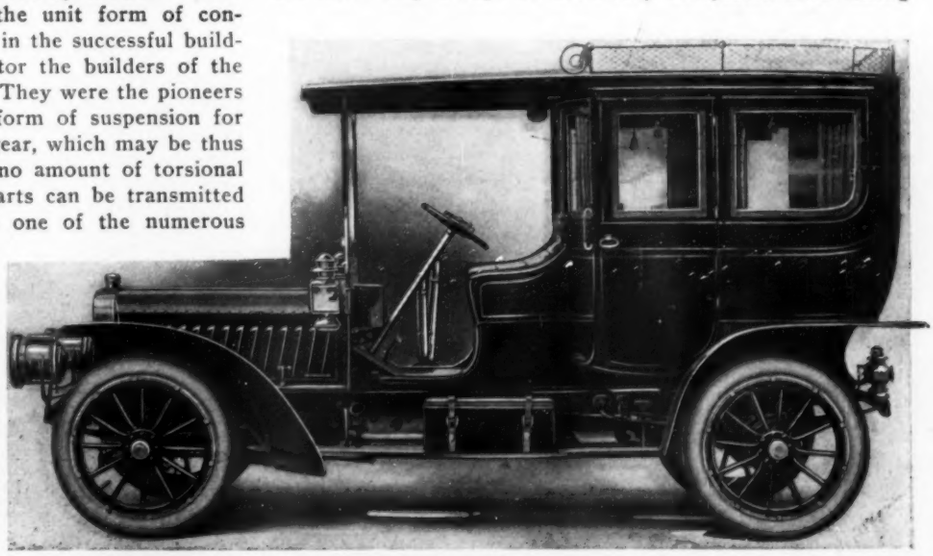


THE success of the Stevens-Duryea cars may well be termed the reward of consistent adherence to a well-outlined policy adopted as the result of confidence in a particular type of car, as the builders, the Stevens-Duryea Company, Chicopee Falls, Mass., were one of the first manufacturers to market six-cylinder cars in this country. Realizing from the outset, however, that what was needed was not merely a fifty per cent. enlargement of the four-cylinder motor as it then stood—in other words, not a motor half again as powerful, but one of the same power with the advantages of the greater number of cylinders, the Stevens-Duryea engines are not merely replicas of their four-cylinder type, but have been designed particularly with a view to meeting all the conditions imposed by the new order of things. Two models are listed—the "Light Six" and the "Big Six," as they have come to be known familiarly, their official titles being Model U, which is the 35-horsepower car, and Model S, the 50-horsepower type.

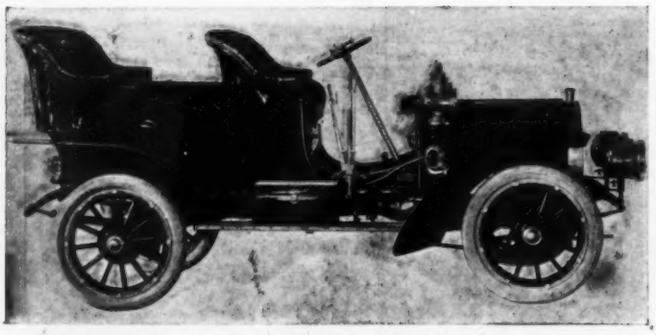
In addition to having been close adherents of the six-cylinder type of car from the earliest days of the multi-cylinder engine in this country, these builders have likewise devoted a great deal of attention to evolving a power plant that is distinctive in a great many features, so that it is natural that the engine in both the small car and its more powerful brother should be distinguished by the same characteristics. The chief of these is the unit form of construction' and upon the value of this in the successful building of a six-cylinder automobile motor the builders of the Stevens-Duryea cars lay great stress. They were the pioneers in this field to adopt a three-point form of suspension for the motor, clutch and change-speed gear, which may be thus combined in one rigid unit, so that no amount of torsional strain of the car's frame or other parts can be transmitted to the power plant, this being but one of the numerous inventions of J. F. Duryea. The great value of such a support in the case of the six-cylinder car is that it insures absolute permanency of alignment to the extra long crankshaft where most needed.

As already mentioned, the description of either of the Stevens-Duryea motors will apply in large measure to the other. The cylinder castings are made separately and the valves are all placed on the same side so as to be operated from a common camshaft, the valves themselves being made interchangeable. The connecting rod and main bearings in the Model U, or "Light Six," are babbitt bushings, while the main bearings of the 50-horsepower car are of the annular ball bearing type, thus requiring but a minimum of attention. The flywheel is placed at the forward end of the motor in each case, this being one of the most distinctive features of the Stevens-Duryea design, while the crankcase supporting arms, of which but two are employed, are placed at a point less than a third of the length of the crankcase from the forward end and are cast integral with it. Throughout the design it has been the aim of the builder to minimize the number of small parts. This will be apparent in the use of a single camshaft, while a second shaft driven through spiral gears from the camshaft takes care of all the motor accessories, operating the large centrifugal pump, the ignition timer and the oiler, the last-named being run through the medium of a flexible shaft extension.

The crankshaft is a one-piece forging ground on the journals to an accurate fit, the clutch member and flywheel fastenings being of the taper and key type, locking with a nut instead of the more usual form of flange construction. A commendable feature is to be found in the careful marking of the flywheel rim to indicate the valve timing, so that the latter may always be accurately readjusted after taking



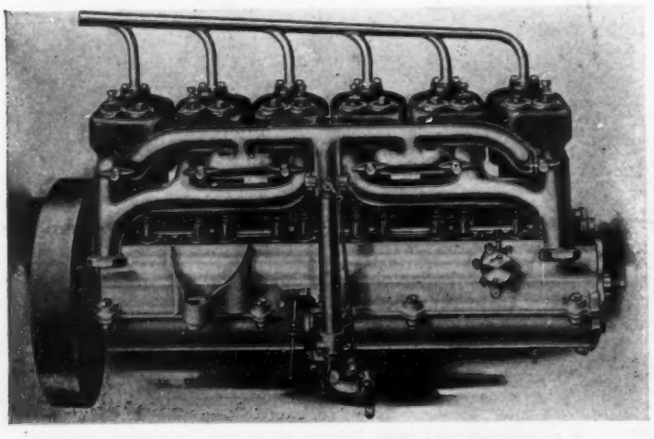
THE STEVENS-DURYEA MODEL U, OR "LIGHT SIX," LIMOUSINE IN COMPLETE RUNNING ORDER.



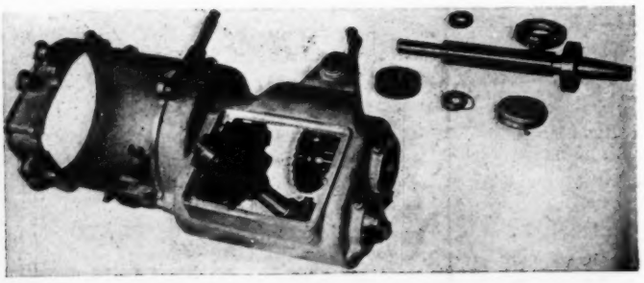
THE MODEL R, 20-HORSEPOWER, FOUR-CYLINDER TOURING CAR

the motor down. In the smaller model provision is made for the withdrawal of the camshaft through a hole in the flywheel, while in the larger car it is necessary to dismount the flywheel itself before this can be done. The timing gears are marked at their meshing point to insure accurate replacement of the camshaft. The manifolds have been made as simple as it is possible to do so on a motor of this number of cylinders, this having been attained in large measure, where the exhaust is concerned, by dividing it into two independent parts. The carbureter employed is of an exclusive design, and in the case of the Model S, or 50-horspower car, is provided with a double jet, and there is special provision made for supplying it with warm air from the motor in addition. A float-feed is used in both cases. A six-feed mechanical oiler with an individual pump for each lead is conveniently located on the dash and takes care of the essential of lubrication. Ignition is of the high-tension type, while a cellular radiator supplied by the large pump shown is employed for cooling.

Although bolted together in one rigid unit by means of a cylindrical casing of aluminum alloy, none of the parts of the motor, clutch or gear set are any the less accessible on that account, as will be quite evident from the view showing the manner of removing the multiple disc clutch merely by the lifting off of the sectional portion of the housing which incloses it. In the Model U this clutch consists of a series of cork-faced brass discs alternating with a series of steels discs, the driving member connected with the engine shaft carrying the first set and the driven member the second. The two sets of discs are forced together by a powerful self-contained spring carried in the driving member. Adjustments for wear are easily made by means of a series of milled grooves, an adjusting pin and nut and six holes in the milled grooves of the driving member, which combine to make adjustment practically automatic, as the nut can only be locked at certain points. The clutch may also be dismounted bodily with but little trouble.

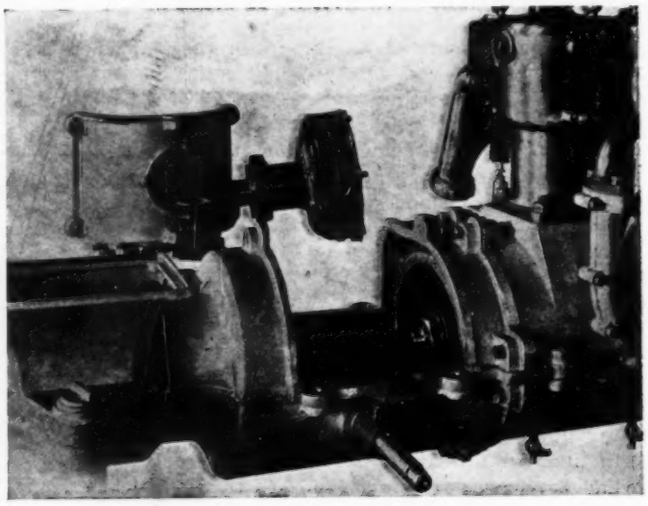


INLET SIDE OF THE MODEL U SIX-CYLINDER MOTOR.



THE THREE-SPEED GEAR SET SUPPORTED ON BALL-BEARINGS.

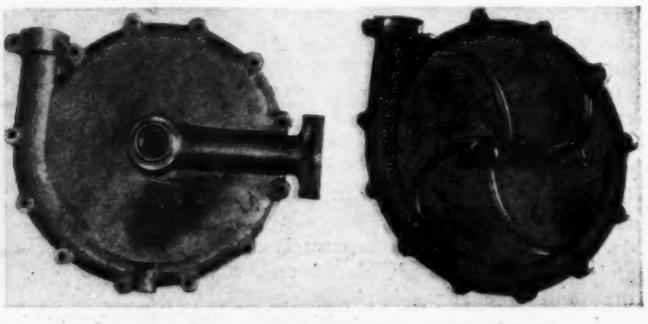
The gear set is of the standard sliding type and provides three forward speeds and the usual reverse, being the same on both cars. A patented self-finding device is employed on the shifting lever. Compactness of arrangement and a saving in weight and necessity for adjustment are gained by the use of annular ball bearings on the "Big Six." The final step in the transmission of the power is by means of a propeller shaft and live axle. Two sets of brakes are employed, the external contracting pair, or running brake, being



HOW THE MULTIPLE-DISC CLUTCH MAY BE DISMOUNTED.

pedal-operated in the usual manner, while the emergency brake is composed of the internal expanding members, which are operated by the hand lever.

Some of the other specifications of the small car are an I-beam forged front axle, chrome nickel-steel frame, 40 and 48-inch semi-elliptic springs, 114-inch wheelbase and 34 by 4-inch tire equipment on all four wheels. In the case of the 50-horsepower car, the wheelbase is 122 inches and the tire equipment consists of 36 by 4-inch front and 36 by 5-inch tires on the rear. Hess-Bright ball bearings are used throughout in this car. The Model R, four-cylinder, 20-horsepower touring car is also continued.



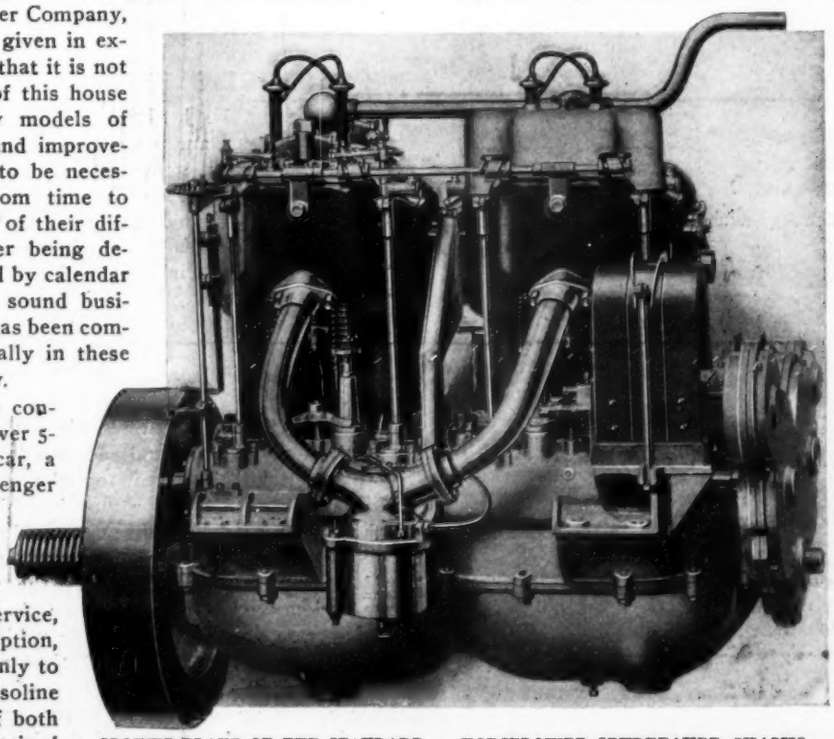
DETAILS OF THE CENTRIFUGAL CIRCULATING PUMP.

STUDEBAKER LIMOUSINE, MODEL H, 30-HORSEPOWER.

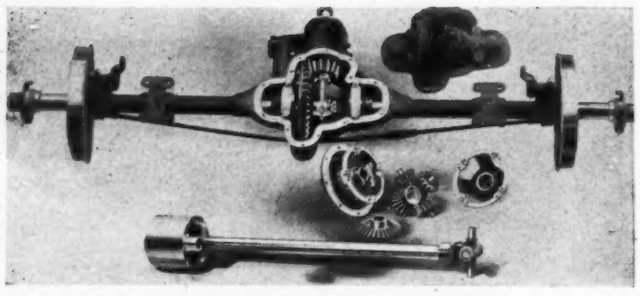
"FROM the viewpoint of the engineer, the gasoline automobile of the present day does not differ radically from a type that was accepted as standard almost three years ago. The problems that confront the manufacturers of to-day are of an educational nature. The day of exclusive features, which have been brought up by clever salesmen and thrown at prospective customers as 'talking points' is rapidly passing. The automobile of to-day does not depend upon sensationalism for its sales. It passed the experimental stage years ago." The foregoing, which is quoted from the announcement of the Studebaker Company, South Bend, Ind., is given in explanation of the fact that it is not the business policy of this house to bring out yearly models of cars, such changes and improvements as are found to be necessary being made from time to time, the production of their different models neither being delayed nor precipitated by calendar dates. That this is sound business common sense has been commented upon editorially in these columns but recently.

Their present line consists of a 30-horsepower 5-passenger gasoline car, a 40-horsepower 7-passenger gasoline car and a complete range of electric vehicles for both pleasure and commercial service, the appended description, however, referring only to the chassis of the gasoline cars. In the case of both models only recognized standards of automobile engineering have been followed, as a short résumé of their more salient features will show. Pressed steel frames of the usual channel section form the foundation in each case, the motors are of the four-cylinder vertical type, employing twin-cylinder castings with integral jackets, and a centrifugal, gear-driven pump is used to circulate the cooling water.

One point in particular will strike the observer who is familiar with the majority of American cars and the details of their power plants, and that is the accessible location of the carbureter, this essential, in many cases, having had to make room for other accessories placed on the same side of the motor and in consequence being crowded into a most "ungetatable" location. Ignition is of the low-tension type which the designer of the Studebaker chassis has so consistently adhered to and which has been brought to such a high state of development in this instance during the several years that the car has been on the American market. The source of current consists of a Simms-Bosch low-tension magneto, so arranged that it can be readily removed



POWER-PLANT OF THE STANDARD 40-HORSEPOWER STUDEBAKER CHASSIS.

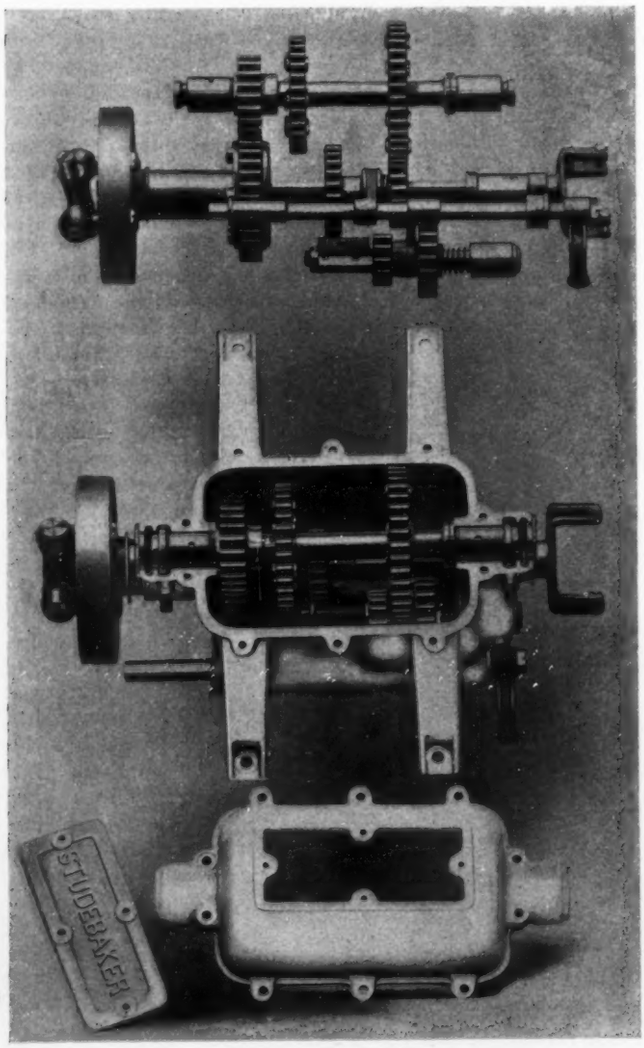


TYPE OF REAR-AXLE DRIVING UNIT EMPLOYED.

without disturbing any other part of the mechanism and so that it can be replaced without the necessity of retiming it to the motor. While the chassis in question show a great similarity in the majority of features, there is one in which they differ, and that is in the type of gear-set, or rather the method of its operation, in the case of the smaller car.

The 40-horsepower seven-passenger car is equipped with a slide change-speed gear, the shafts of which are mounted in annular ball bearings and which operates on the selective plan of gear-changing, while on the 30-horsepower chassis the progressive type of gear-set that has proved so eminently satisfactory in service on this model in past years has been retained without a change.

On both models the brakes have been made unusually large and substantial, and in the case of this essential also there is a slight change to be noted between the two chassis. On the smaller the pedal brake used for running service operates on a drum placed on the transmission, while the emergency brake consists of drums mounted on the driving wheels and is operated in the usual manner by means of a side lever. On the 40-horsepower chassis both sets of brakes are concentrated on the rear hubs, being of the standard internal-expanding and external-contracting type. A feature of the gear-set of this chassis is the provision of the direct drive on the third speed, the fourth speed being a step-up for speeding only, while the gear-ratio on the third speed, or direct drive, is made suitable for touring oved the usual types of roads found in this country, as well as for overcoming anything but very stiff grades.



ESSENTIALS OF THE TRANSMISSION, 30-HORSEPOWER CAR.

In both cases the forward axles are of the standard I-beam section and are drop-forgings of nickel-steel, while the rear axles are of the floating type. On the larger car, the latter is reinforced by a pair of side jack rods in connection with the central torsion rod of the propeller shaft drive. Comparing other features of both these cars, it will be realized how closely they adhere to the highest recognized standards as represented by current engineering practice in this field. The motors are conservatively rated, the dimensions of the larger, of 40 horsepower, being 4 3-4-inch bore by 5 1-4-inch stroke, its output being produced at a comparatively low normal speed; the smaller car is equipped with a motor the dimensions of which are 4 1-2-inch bore by-5 1-4-inch stroke.

The valve operation is identical in both cases, being of the direct thrust type, with both valves of the same size, while the motor accessories are the same in both instances throughout, an automatic carbureter, centrifugal pump, cellular radiator and positive type of mechanical force-feed oiler of the same make taking care of these essentials on both cars. The motor is protected from beneath by an enclosing aluminum pan, while the dash is made of concave form and of pressed steel. The suspension consists of semi-elliptic springs front and rear, the only difference between the cars being that of dimensions. The wheelbase of the smaller is 104 inches and its tire equipment consists of standard clincher measuring 34 by 4 inches on all four wheels, while the same dimensions in the case of the larger car are 114 inches for the wheelbase and 34 by 4 1-2-inch tires.

WHY THIS REAL ESTATE MAN USES AN AUTO.

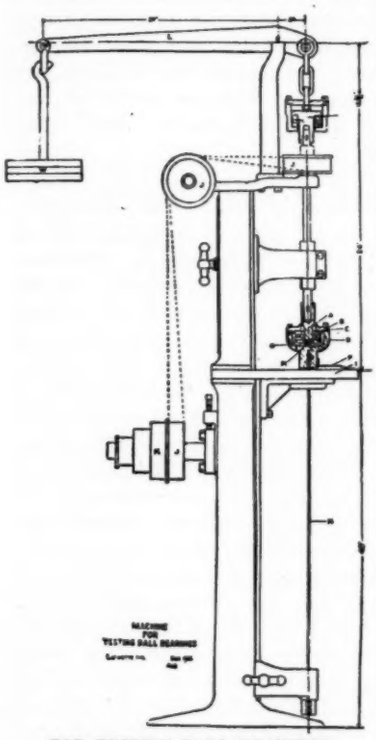
ASBURY PARK, N. J., Jan. 27.—George W. Pittinger is a real estate broker and also an automobilist. No. 6 is his registration number, showing that he was one of the first motorists in this State to take out a license.

As a real estate man Mr. Pittinger, with his automobile, is in a class by himself. The other brokers use horses and carriages to take their clients about, but Mr. Pittinger is thoroughly up to date. It is safe to say that, all things being equal, people looking for houses to rent or buy call upon the man with an automobile first and have him take them out in his machine, going right by the other agents who have horses.

According to Mr. Pittinger his automobile is more economical, more reliable, and requires less care than a horse. His expense bill last year on the car (a single-cylinder Cadillac) averaged $13.50 a month, which included the care of the car, repairs, gasoline, etc. He was able to do as much business with a single car as other real estate men could do with two rigs, because the automobile, unlike a horse, did not grow weary. Then there was not the need of a driver to occupy space in the vehicle, nor the necessity for hitching the machine every time a stop was made, so that, taken all in all, the advantages of the automobile in the service of this up-to-date real estate man saved its own cost many times over by reason of the increased business done.

TESTS OF GRAPHITE ON BALL BEARINGS.

There have from time to time appeared articles in the various trade papers condemning the use of graphite as a lubricant for ball bearings, says *Graphite.* Professor Goss, late of Purdue University, has made some extensive tests with Dixon's Ticonderoga flake graphite as a lubricant for ball bearings combined with kerosene oil, lard oil and vaseline, and found that friction losses were very much reduced and the bearings made to carry a heavier load. The following are extracts from Professor Goss' report.



FOR TESTING BALL BEARINGS.

The general appearance of the machine used in making the test is shown by Figure 1. The bearing tested was a grooved ball-thrust bearing and was made by the Standard Roller Bearing Company of Philadelphia, Pa. It consists of two hardened steel rings, each having a race to receive the balls. The bearing fits a 1 5-8 inch shaft and contains 23 7-16 inch balls. The lower race is caused to revolve through the action of the machine, while the upper one is fixed in position. The pressure imposed upon the balls is regulated by means of weights applied to the lever arm, which is of such length that each ten pounds applied to the weight-pan gives a reaction of 90 pounds along the line of the spindle and thence to the test ball bearing.

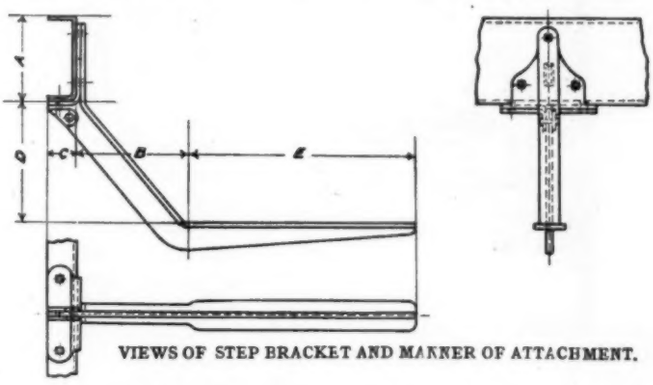
It has been shown by previous experimentation that graphite can be efficiently applied as a lubricant when mixed in small quantities with oil or grease. Following this practise, six series of tests were run; the lubricant employed upon the test ball bearing being, respectively, kerosene, a mixture by weight of 96 per cent. kerosene and 4 per cent. graphite; lard oil, a mixture by weight of 96 per cent. lard oil and 4 per cent. graphite; vaseline, a mixture by weight of 96 per cent. vaseline and 4 per cent graphite; the graphite in all cases was Dixon's Ticonderoga flake graphite.

As the result of these tests Professor Goss says in part that the following general conclusions may be drawn:

"A combination of graphite and lard oil makes a lubricating mixture which, when applied to ball bearings, will accomplish everything which lard oil alone will do and which at the same time will give a lower frictional resistance of the bearing and permit a large increase in the load which it may be made to carry. An oil as light as kerosene, when intermixed with graphite, will be converted into an effective lubricant for ball bearings when operated under light or medium heavy pressure."

AN IMPROVED FORM OF STEP BRACKET.

It has been customary with a number of automobile manufacturers to employ drop-forged brackets, or hangers, to support the running boards on their cars, but in view of the service these parts are called upon to perform this forms a comparatively expensive method of producing them. The engineers of the Parish & Bingham Company, Cleveland, O., have made a study of this apparently unimportant part of a car, and as a result have found that both the drop-forged and the pressed steel hangers have their disadvantages. The latter are said to develop a weakness where they are riveted to the side frame and where they are bent to conform to the running board. They have accordingly designed a combination T iron and pressed-steel bracket which is shown by the accompanying reproduction from a blue-print. The illustration shows it riveted on to a section



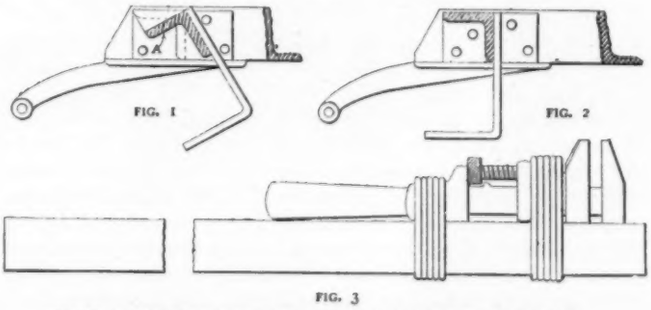
VIEWS OF STEP BRACKET AND MANNER OF ATTACHMENT.

of a side rail in such a manner that the T iron, pressed steel pieces and side rail become a composite whole when the job is finished. By referring further to the print, it will be seen that the dimensions *B*, *C*, *D* and *E* can be varied to suit the requirements of the individual manufacturer. Strength and rigidity at vital points are the advantages claimed over the pressed steel hanger, and economy of manufacture over the drop-forged type of the same style. The makers call particular attention to the pressed steel pieces on both sides of the hanger under the side rail, which act as a brace to prevent any lateral movement, a construction that is rather novel in the application in question.

THE MONKEY WRENCH IN AN EMERGENCY.

The writer was once called upon to get an automobile in running order after it had met with a collision, says E. A. Charles in *The American Machinist.*

The car was standing along the roadside out in the country, with the cooler and its supporting angle all twisted out



HOW A MONKEY WRENCH SERVED A USEFUL PURPOSE.

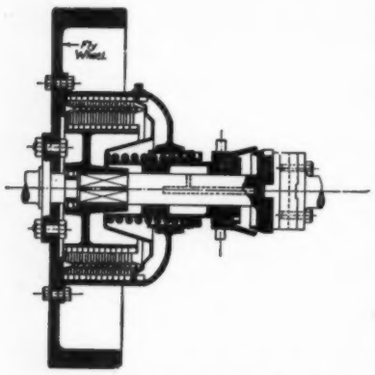
of shape. This cooler-supporting angle presented an appearance about as shown at *A*, Fig. 1, while it should have been straight, as in Fig. 2. To get the car running it was necessary to get this cross-member straightened. The only available tool was a monkey-wrench.

A wooden bar 6 feet long by 3 inches square was found along the roadside, and the wrench was fastened securely to one end of this by means of a wire, as shown in Fig. 3.

With this long lever arm on the monkey-wrench, the steel angle was straightened very easily, the cooler was placed in position and the car proceeded on its journey.

THE AMERICANIZED HELE-SHAW CLUTCH.

One of the most important developments of the past few months in the parts field has been the obtaining of the exclusive rights for this country of the Hele-Shaw multiple disk clutch by the Merchant & Evans Company, Philadelphia. Powell Evans, of the latter firm, has made considerable study of this clutch, and by making its essential elements out of sheet steel pressed into the required form, has succeeded in both materially lightening and cheapening the Hele-Shaw device. The change in question was suggested by Mr. Evans while in England last summer and resulted in the French and English companies lowering prices, and the obtaining of numerous orders for foreign cars by his firm. Not the least important feature of the altered design is that it effects a substantial reduction in the cost of production.



SECTIONAL VIEW OF FLYWHEEL TYPE.

The chief difference between the Hele-Shaw and other multiple-disk clutches generally, is that in the former the rings, or disks, are made with V-shaped annular grooves formed by circumferentially corrugating the surface of the disk. The outer edge of one and the inner edge of the other of each pair of disks is notched to engage respectively with the bars or ribs of the outer casing and inner drum. The outer casing is made fast to the driving element, usually the flywheel in the case of an automobile, while the inner drum is attached to the driven shaft. In the larger sizes of these disks, the teeth are reinforced with shoes which offer an increased sliding surface.

THE HELE-SHAW AUTO CLUTCH COMPLETE.

The impossibility of obtaining long-continued satisfactory service with old types led to a close study of the problem by Professor H. S. Hele-Shaw, a well-known mechanical engineer, and after considerable investigation and experimenting he hit upon the simple expedient of employing an annular V groove in the disks. But this was not an end of the matter by any means, as exhaustive experiment was required before the proper angle for the groove to give the highest efficiency could be determined. The result of a great number of experiments finally led to the adoption of a 35-degree groove, and showed further that the rate of engagement or "pick-up" of these grooved disks was very uniform. The grooves make a clutch of the same number of disks much more powerful than the same number of flat disks under the same pressure, with a greatly reduced spring pressure to perform the same work, and at the same time no more room is required for disengaging.

Ample evidence of the maker's statement that the Hele-Shaw clutch is designed to be run continuously in a slipping condition without fear of buckling or in any other way injuring the plates, is to be found in the fact that the Brillie 'buses in Paris, on which they are used, operate in practice with two speeds forward, starting and running, the intermediate speeds being obtained by pedal control of the clutch. This is accomplished by distributing the load over all the surfaces in contact, the great number of plates with their thoroughly lubricated wedge area placing but a fraction of the load on each part, which also minimizes the wear. The Hele-Shaw clutch is made for a wide variety of uses, and in addition to a complete line for automobile, motorboat and industrial uses, the Merchant & Evans Company also manufacture the Evans change-speed gear, which is of the multiple direct-drive type combined with the rear axle, the Evans spring motor suspension chassis frame, for cab, touring car or truck use, and employing a straight-line drive requiring no universals, beside a number of other specialties such as the "Star" metal spare tire case, imported axles, and the like.

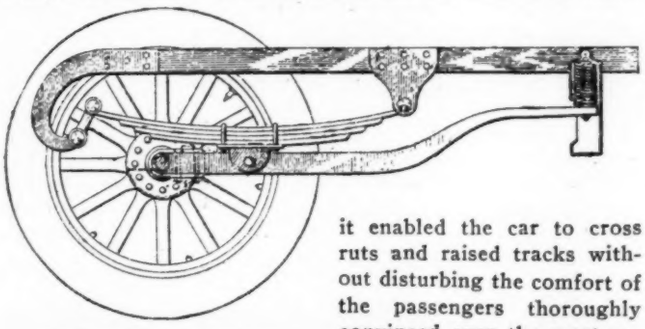
THE COMBINATION FAN-FLY WHEEL.

Numerous attempts have been made to combine the fan and flywheel in automobiles, says *The American Machinist.* These experiments have usually taken the form of a spoked flywheel with a number of sheet-metal blades cast in place between the spokes, but, owing to the very intricate pattern and core boxes, and the difficulty in moulding such wheels, their use has not been found practicable. An out-growth of these experiments has taken the form of a flywheel with several spokes—usually five or seven—which are themselves cast in the form of blades. Such flywheels have been found entirely satisfactory in practice, and some manufacturers are using them, thus dispensing with all fan parts proper at the expense of very little added complication to the flywheel. . . . Doubtless the thin sheet-metal blades of a specially designed fan would be more efficient than the thicker and rougher cast blades or spokes in the flywheel. There is another feature to consider. In front of the fan, in the space swept by the revolving blades, a slight vacuum is formed, into which the air is constantly rushing, and being carried through the fan and out of the openings provided for it. Before it is forced out through these openings, it is under a slight pressure. If the fan hub is small enough, there will probably be a space where the linear velocity of the blades, near the hub, would not be sufficient to force air against the slight pressure back of the fan, and the air currents would be reversed. For this reason the space in the flywheel occupied by the large hub would not be very effective were the hub of normal size. . . . Experiments show that for automobile service a 30-degree angle of the blades gives the best results. The edges of the blades should be as sharp as can be cast, with the center about 3-8-inch thick, and should be tied to the rim and hub by generous fillets. The general shape of the balance, and the blades and spokes of the same size and angle, each is made by a core made in the same core box. As this flywheel has seven blades, each core is one-seventh of the circumference, and contains one blade. This blade is made fast to the base of the triangular-shaped core box; the base is easily removable, as the blade parts near the hub. To further insure perfect balance, small bosses or lumps of metal are cast on the inside of the rim, between the spokes; these projections may be chipped as required when the wheel is machined and balanced. As these spokes are necessarily somewhat delicate, trouble is liable to occur through the severe strains set up in them when cooling, and fracture may result. It has been found by experiment that better results are obtained by placing the mould, after it has been poured, into a heated oven, and allowing it to cool gradually.

"In a gas engine there should be no boxes nor unnecessary ports; there must be holes for the valves, but there should be no pockets in the side, the valves all being in the head. In that way there is obtained a cylinder with the minimum surface for the maximum volume."—*Extract from Report Gas Engine Research Com. Inst. Mech. Engrs.*

THE NEW STOLP SHOCK ELIMINATOR.

Among the novelties brought forth at the Palace show last fall was one in the shape of a shock absorber that caused the technically wise to shake their heads skeptically when they saw it, and even the explanation of the inventor, Oscar Stolp, of the wire manufacturing house of Shepard & Stolp, of New York, did not suffice to convince them that the most unusual looking device was possessed of the merit claimed for it. Some of the worst doubters were taken out in Mr. Stolp's car fitted with his invention and the manner in which



STOLP DEVICE AS APPLIED.

it enabled the car to cross ruts and raised tracks without disturbing the comfort of the passengers thoroughly convinced even the most expert skeptics. But in order to demonstrate beyond any question the practical value of his invention, Mr. Stolp has had a set of the shock eliminators fitted to one of the Locomobiles in the service of the New York City Fire Department. This car is employed in the Borough of Brooklyn, where there are many rough stretches, and the officials who have occasion to cover them at speeds are loud in their praises of the device.

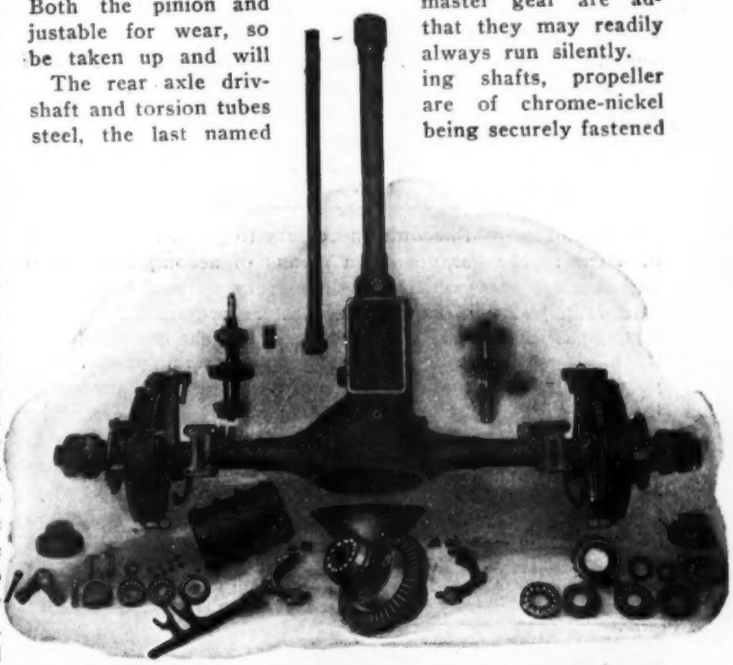
The accompanying line sketch serves to illustrate both the Stolp shock eliminator itself, as well as the manner of its application. It also shows the relative positions of the connecting parts of the frame and axle, which are claimed by the inventor to be productive of a great increase in resiliency which is not accompanied by a corresponding increase in the rebound transmitted to the body of the vehicle. As will be plain from this sketch, the Stolp shock eliminator consists of a lever revolubly mounted at its after end on the axle of the car, and attached at its other end to the side frame through the medium of a helical spring. Means are also provided for the mounting of the car spring itself at a point on this lever slightly forward of the axle, instead of on the latter, as is the usual practice, from which it will be apparent that the principle of the device is radically different from that of the usual shock absorber in that the object aimed at is not to retard or control the action of the car springs, but to actually absorb the greater part of the shock before it reaches them.

The operation of the device is as follows: When the wheel passes over a depression or elevation, the axle is forced up and the car spring slightly compressed, the forward end of the lever being forced downward against its restraining spring at the same time as the main spring is pivotally attached to the lever, the latter continuing to oscillate slightly until the various members resume their normal positions. From this it will be apparent that the shock transmitted to the wheels and connecting parts, moving either to or from the car frame, will reach them in the form of two opposing forces, respectively applied to the main spring of the car and the auxiliary spring at the forward end of the lever. Since these forces are almost directly opposed to one another, their combined effect on the body of the vehicle is practically nil, as their effect is neutralized. The device is adapted to be attached to the forward wheels of the car in the same manner except that the levers are naturally designed to be placed in a position opposite to that shown. A patent was granted to Mr. Stolp covering it in April, 1907.

NOVEL REAR AXLE DRIVING UNIT.

Current engineering practice favors the combination of the gear set with the differential and bevel drive as a unit, and in designing a component of this kind the Standard Roller Bearing Company, Philadelphia, Pa., have embodied in it many features of merit. The housing is unique in that it consists of a single crucible steel casting, all the supports of bearings throughout both the gear set and differential systems being cast integral with it, thus absolutely preventing their disalignment in service. Aluminum is used in the covers to lessen the weight, one being employed over the top of the gear set and the other at the rear of the differential, thus making both very accessible. Three forward speeds are provided, the shafts and pinions being of high-grade chrome-nickel steel running on Standard annular ball bearings. The direct drive is obtained by a dental jaw clutch connection through the propeller shaft and the forward end of the secondary driving shaft, which is supported in the pocketed end of the propeller shaft on a roller bearing, thus insuring permanent alignment of the gear faces. The bevel gears and the master gear are made of high carbon steel having great capacity to resist torsional strains. The differential mechanism is mounted on Standard annular ball bearings, the driving thrust of the master gear being taken by ball thrust bearings on either side of the differential and the driving thrust of the pinion and secondary shaft being taken by a special ball bearing inserted immediately back of the pinion. Both the pinion and master gear are adjustable for wear, so that they may readily be taken up and will always run silently.

The rear axle driving shafts, propeller shaft and torsion tubes are of chrome-nickel steel, the last named being securely fastened in the forward end of the main housing while it is provided at the upper end of the tube with a steel casting, carrying a ball thrust bearing and an annular ball bearing supporting the propeller shaft. The torsional strains due to stopping and starting, as well as driving, are transferred from the torsion tube directly through a cross member to the frame in a simple and effective manner. The accompanying illustration depicts the various essentials of the Standard rear-axle driving unit, which practically constitutes a complete transmission system minus the clutch, which is usually a part of the motor in reality as now constructed. In this photograph every loose or moving part has been dismounted and is displayed on the background while only the housing remains intact. From the view of the latter the accessibility of the various parts of the gear-set and differential will be apparent. A complete set of brakes is also a noteworthy feature.



COMPONENTS OF THE STANDARD COMBINED AXLE AND GEAR-SET.

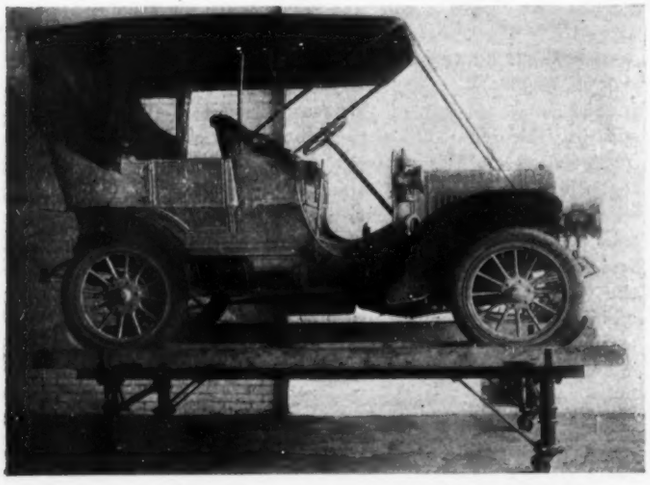
MAPLEBAY AIR-COOLED RUNABOUT FROM THE NORTHWEST

A NEWCOMER FROM MINNESOTA.

From Crookston, Minn., has been sent forth a sturdy, speedy looking little runabout which should give a good account of itself, if its strenuous début proves anything. The Maplebay Manufacturing Company, responsible for the newcomer, declare that it has been tried out under the severe road conditions of the West without any defect being discovered in its make up. A particularly strong feature for an automobile intended for a life on rough roads is its road clearance of 15 1-2 inches, the axles being the lowest part of the car. A four-cylinder Reeves air-cooled engine, developing 22 horsepower, is employed. A friction drive, of the firm's own design, and operated by a single lever, is employed on account of it being one of the simplest and most robust types in existence.

A HANDY SUBSTITUTE FOR A PIT.

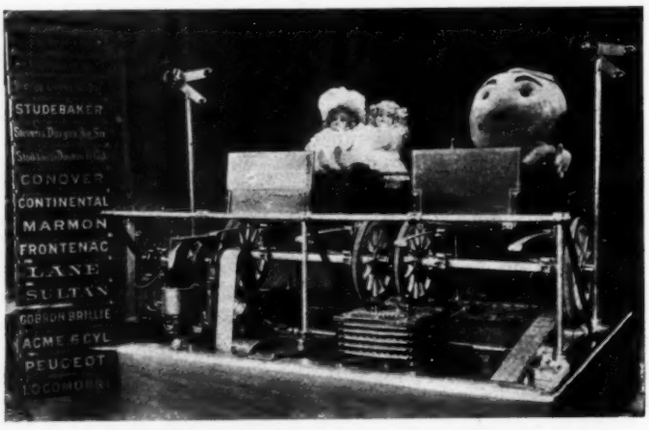
Now and again it becomes necessary to get at the underside of a car in the garage and a means of accomplishing this without a pit is something that every autoist who takes care of his car, and many small dealers, require. T. Neville & Company, Oshkosh, Wis., have just brought out the handy truck, shown in the accompanying photograph, for this purpose. The frame is made of heavy angle iron supported by steel tubing, braced and mounted on double rollers. The bed is made of two-inch planks, so that the whole truck is very substantially made and is designed to withstand any amount of rough usage. Provision for blocking the front and rear wheels of the car so that it cannot run off the bed is in the shape of sets of movable blocks adapted to be fastened to the bed at any point by means of pins, so as to accommodate cars of any wheelbase.



HANDY TRUCK DESIGNED TO REPLACE PITS IN GARAGES.

AN EFFECTIVE SHOCK ABSORBER EXHIBIT.

That actual demonstration is worth more than all the talk that can be marshalled in favor of the good points of a device has long been recognized by the progressive manufacturer, but it remained for the Truffault-Hartford Suspension Company, 67 Vesey street, New York, to show how this could be done most effectively in the confines of a show booth. Two miniature cars were used, one fitted with Truffault-Hartford shock absorbers and the other without. The occupants of the former consisted of a pair of dainty wax dolls, while a rather ludicrous clown doll tried to hold down the other one. A rough road was simulated very effectively by revolving pulleys with bumps on them, the wheels being run at a normal speed. While the car fitted with the shock absorbers staid on the ground with its wheel constantly giving traction, the car without them was in the air half the time and its passengers certainly came in for a jolting. As a climax, one of the springs on the car without the shock absorbers snapped on the last day of the show, thus affording conclusive proof of their value in saving the springs.



HARTFORD-TRUFFAULT EXHIBIT AT RECENT IMPORTERS' SALON.

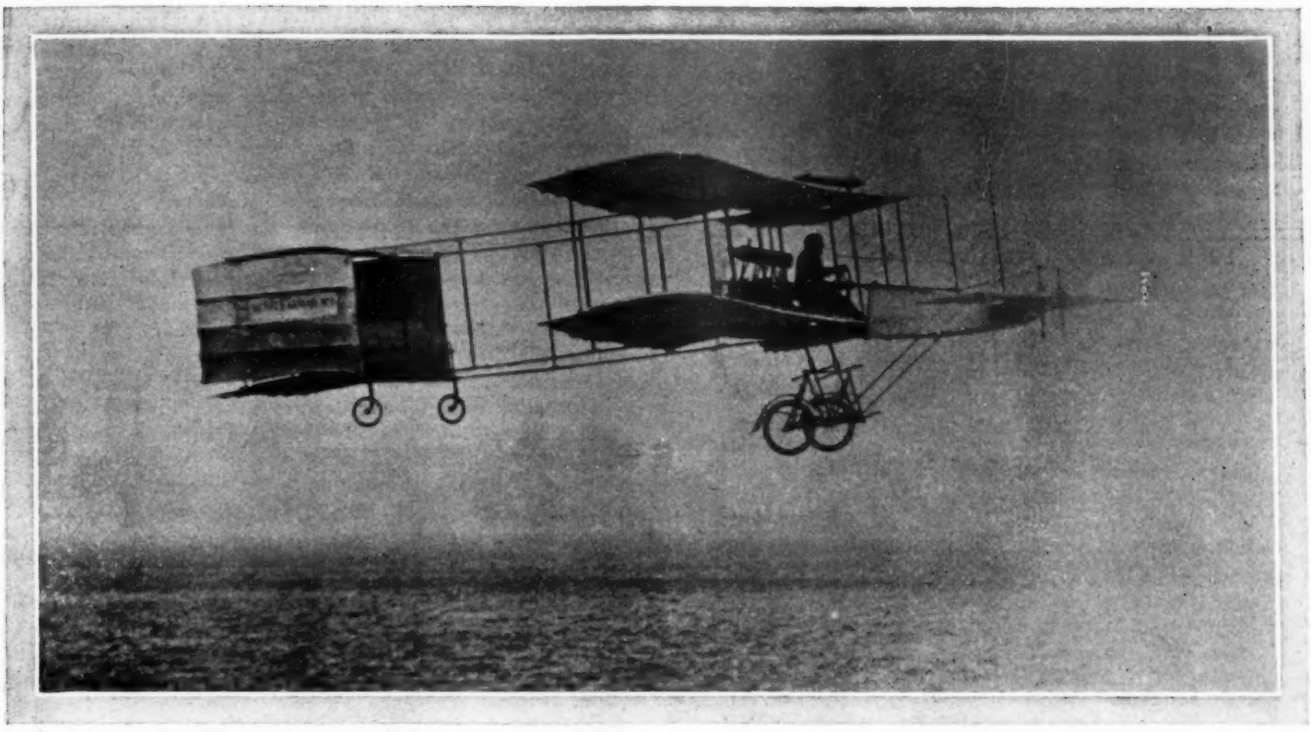
SEVEN CITIES WANT AUTO FIRE ENGINES.

KENOSHA, WIS., Jan. 27.—Seven cities of Southern California are ready to begin negotiations for the purchase of automobile fire engines, now that the two Rambler cars, specially built and equipped with fire-fighting apparatus for the city of Long Beach, have proven efficient.

Long Beach was the first city on the coast to order auto fire engines, and these were designed at the Rambler factory at Kenosha. They have 40-horsepower motors, a speed of thirty miles an hour is possible, and they will carry 800 feet of 2-inch jacketed hose, a 35-gallon copper chemical tank, and 200 feet of 2-inch chemical hose. Space is provided for buckets, hooks, several short ladders, axes, and four men.

In a competitive test between a Rambler car and the old horse-drawn apparatus, made before the order was placed, a short run of 3,880 feet was arranged. Everyone, except the Rambler man, put his money on the horses. The auto was to start with a dead engine. The Rambler won, making the distance in just two minutes flat. Immediately the city officials decided to replace all horse-drawn vehicles with automobiles.

Since the cars were installed the Rambler agent has invented a tilting incline platform on which the car stands level when housed. At the sound of the alarm the driver springs to the seat of the car and drops a hook which releases the chain securing the platform. The platform tips, the car glides down, and the engine starts itself and the race to the fire begins without the loss of a second's time.



HENRY FARMAN MAKING THE WORLD'S FIRST OFFICIAL FLIGHT OF ONE KILOMETER ON A HEAVIER-THAN-AIR MACHINE.

FARMAN TELLS HOW HE MADE RECORD FLIGHT

PARIS, Jan. 18.—"I had been training so long and had so much confidence in my machine and my ability to handle it that I was certain of success in my attempt to win the Deutsch-Archdeacon prize. But despite my confidence, there was just a little fear that some trivial accident might occur at the last moment and rob me of victory.

"Luckily everything passed off well; my aeroplane was perfectly stable, the motor roared powerfully and was regulated like a clock, and I knew as soon as I started upwards that success was mine. I took the turn gently, advanced the ignition as I got round, then on the straightaway home retarded the ignition, brought the machine to thirteen feet from the ground, then made straight for the flag. Before I had time to think anything more about it or gather any impressions I had won."

It was thus that Henry Farman, champion flyer of the world, told his story of winning the Deutsch-Archdeacon prize of $10,000, when found in his garage an hour after the event which history will recall as one of the most momentous in the struggle of man for aerial supremacy. Farman started up his motor at 10:15 on the morning of January 13, on the Issy-les-Moulineaux ground, outside the walls of Paris. After traveling twelve yards on the ground he rose to a height of thirteen feet and cut the actual starting line at that distance from the ground. An instant later he was veering towards the left and rising at the same time to a height of eighteen feet. Another second and he had swung round the post, the huge artificial bird answering her helm perfectly; another few seconds and the kilometer flight had been accomplished, time, 1 minute 28 seconds. Officially the distance is one kilometer, but as the committee's measurements are merely from the point at which the machine left the ground to the flagstaff which it succeeded in rounding, Farman should be credited, by reason of the curves which he described, with an actual flight of from 1,500 to 1,800 meters, equal to 1 mile, 140 yards.

HENRY FARMAN, CHAMPION FLYER.

Henry Farman, who must now be accorded the honored position of the world's champion flyer, was born in Paris thirty-five years ago. Cycling claimed him as one of its enthusiastic and skilled devotees; riding with his brother Maurice on a tandem, his victories were numerous. Racing automobiles took his attention later, and showed that he was as skilled behind the wheel of a roaring 120-horsepower as on the bicycle saddle. The story is still told in automobile circles of how in the last Gordon Bennett race he took a dangerous turn at 90 miles an hour, having mistaken it for an easier one, and shot over a precipice. The car crashed down several hundred feet, but Farman and his mechanic were caught in the branches of a thick tree. Recovering himself, Farman rolled a cigarette and called to his mechanic, unhurt a yard below, "Say, Jean, have you got a match?"

Farman announces that he will rest for a month while his second machine, on slightly improved lines, is being built by the Voisin Frères. His present aeroplane will also be strengthened and altered in a few particulars, the constant work which it has had to undergo during the last two months having weakened it. After that it is Farman's intention to go to England and compete in all the contests which offer reasonable chances of success.

During the public banquet, at which Henry Farman was presented with a check for 50,000 francs, honor was paid to the Voisin Brothers, builders of the aeroplane, and to Léon Levassor, the designer of the 50-horsepower eight-cylinder motor used on the successful aeroplane.

THE AUTOMOBILE

Vol. XVIII Thursday, January 30, 1908 No. 5

THE CLASS JOURNAL COMPANY

Flatiron Building, Madison Square
New York City

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Entered at New York, N. Y., as second-class matter.

The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

Copies printed in 1905 - - - - - - - - - - - - - 730,000
" " in 1906 - - - - - - - - - - - - 791,000
" " in 1907 - - - - - - - - - - - - - 888,900

ANNOUNCEMENT

The Class Journal Company, owner of "The Automobile," has purchased "Motor Age," published in Chicago, thus signifying unhesitating confidence in the future of the great industry in the interests of which these papers are produced. The combination of facilities will strengthen both publications in a most substantial manner, and these two weeklies—one in the East and the other in the West—will more efficiently reflect and aid the progress of automobiling and allied interests.

Instability of Design the Greatest American Fault. In most lines of endeavor that can be compared to that of building automobiles, the man who has achieved success is duly appreciative of the means whereby he gained it and jealously guards the foundation upon which it is built. If he has made a reputation by building a certain type of machine, he does not attempt to enhance it by abandoning that machine and trying his hand at designing another for identically the same purpose. Instead, he carefully adds to the successful fabric already reared, continually refining and improving it in detail, though it always remains the same machine and is always at the head of its class. Just why this should not be equally true of the building of automobiles is an anomaly that has been directly responsible for more than one prominent failure in the past, and its influence is bound to be felt to an increasing extent from now on.

The automobile-buying public may be fickle, but human nature is much the same regardless of what the thing to be bought happens to be. True, there has been a great deal of slap-dash buying of high-priced cars in which treating has been one of the most prominent inducements, but this is now a thing of the past. The man who buys a car to-day wants to know what its predecessors were capable of doing—in other words, the reputation of its builder for stability of design, and with this fact before one, it is possible to mentally review America's most successful cars, noting that each one is distinguished by this qualification.

What inducement there may be for the successful designer of a car that has made a good name for itself to abandon his work for something new and untried is certainly a mystery, particularly in view of the fact that so many ventures of this kind get as their sole reward the obituary, "he guessed wrong that time," with a consequent shrinkage in the value of the name of the builder. Some makers who appear to be unable to stick to one design for any number of years have achieved for themselves a reputation of being able "to guess wrong every time." Such a policy makes the car doubly difficult to market, a fact that is amply borne out by the relative standing of the most successful cars in the American market to-day.

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Motor Conquest of the Air Practically Accomplished. The second stage in a series of experiments which will only terminate with the complete conquest by man of the problem of aerial navigation has been reached by the magnificent exploit of Henry Farman, winner of the Deutsch-Archdeacon prize. The initial stage was reached in 1906 when Santos-Dumont first succeeded in flying through space on a machine of the heavier-than-air type. The second has been reached by Farman's performance in starting from a given point, rounding a flagstaff five-eighths of a mile away, and returning to his starting point without touching earth. Expounders of the "jump theory" are silenced, and silenced forever. Farman's flight, in actual distance considerably over a mile in length and occupying one minute twenty-eight seconds, was a victory so remarkable as to leave no possibility of doubt as to the final conquest of the air. If there were room for even a shadow of a doubt it would be expelled by his later performance, when he remained for exactly three minutes aloft.

The part played by the automobile in this titanic struggle is no inconsiderable one. Without the internal combustion engine, created and developed by the automobile, flight would have been a material impossibility. Levavasseur, whose name should be coupled with that of Farman, made flight possible by his preliminary work on lightweight motor boat engines, which he lightened, developed and perfected at a time when none but the most optimistic could see any future in the flying machine. There is no denying the fact that the Wright Brothers have lost enormously by the public work of European aeronauts. The brothers from Dayton may have accomplished all they claim, but few authorities will be prepared to pay for whatever they have learned when the results of Farman and others closely following him can be had for nothing.

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An Independent Organization That Is Representative. Though only entering upon its third year of existence, the Society of Automobile Engineers is an independent engineering body that is already representative of the American industry and is daily becoming more so. A large number of designers of the best-known cars produced in this country are now enrolled in its ranks, and in view of the rate at which its membership list is increasing, there is little doubt that the present year will see the addition of many prominent names. That its members are recruited largely from the ranks of one trade organization or another is evidence of the recognition accorded the need for independent effort.

MONSTERS AND BABY RACERS BOTH HAVE A GRAND PRIX

PARIS, Jan. 20.—Nine foreign cars, representing Belgium, Germany and Italy, have already been officially entered in the French Grand Prix to be run the first fortnight in July on a circuit now being chosen. Those heading the list are three Germain cars to be handled by Degrais, Roch-Brault, and Perpère; three Benz, with Hemery, Hanriot and Earl as drivers, and the three Fiat with the classic team of last year, namely, Lancia, Nazzaro and Wagner. Indications are that before the list closes there will be between fifty and sixty cars entered for the greatest road race of the 1908 season. In view of such a possibility an elimination race had been spoken of, but the Racing Board has officially announced that none will be held.

Among French firms, Bayard-Clément, Dietrich, Renault, and Panhard have practically completed their teams. The three Renault cars, now well advanced, will be handled by Szisz, Caillois, and Dimitri. Bayard-Clément has signed up with Rigal and Gabriel, and is about to complete arrangements with Hautvast, the crack Belgian driver. Dietrich will have Rougier and Duray, as last year, and will probably fill the place left vacant by Gabriel by the engagement of the Italian Minoia. Demogeot and Cissac will join Heath in the formation of the Panhard team, Demogeot having become available through the decision of Darracq not to race.

Voiturette Grand Prix Will Unite Single and Two-lungers.

Whatever the number of entries, there will be no elimination for the voiturette race to be run the day before the Grand Prix, and to be known officially as the Voiturette Grand Prix. In view of the extraordinary success which has attended previous races for single and two-cylinder runabouts of from eight to twelve horsepower, the event to precede the Grand Prix is expected to rival its successor in interest. Speeds were attained in last year's events which astounded even experts, and are a guarantee that on such a circuit as that of Dieppe an exciting contest between the baby racers will be witnessed. Regulations call for a bore of not more than 100 millimeters (3.9 inches) for single cylinder cars, 78 mm. for two cylinders, 68 mm. for three cylinders, and 62 mm. for four cylinders. Taking 4.9 inches as the longest practical stroke with a 3.9 inch bore, this would give an engine of about 15 horsepower on European rating.

Judging from previous experience, one and two-cylinder engines will be in the majority, "fours" not being popular in France for very small powers. Maximum weight for all machines is fixed at 1,322 pounds empty, but with oil in the crankcase and gear boxes. Quick change rims and dismountable rims are not allowed. A racing body, providing two seats side by side, both of which must be occupied, is allowed, mud guards and running boards being optional.

First entries for the Voiturette Grand Prix are three Isotta Fraschini, to be driven by Trucco, Minoia, and Giovanzani. The distance to be covered will be from 250 to 300 miles, racing rules in general being similar to those of the Grand Prix, drivers alone being allowed to change tires, make repairs and fill tanks. Entrance fee has been fixed at $200 for a single car, $360 for a team of two, and $500 for a complete team of three cars.

NEW HAVEN'S CHIEF OF POLICE CALLS HALT.

NEW HAVEN, CONN., Jan. 27.—Chief of Police Cowles, who was recently installed at the head of the local police department, has announced a campaign against reckless drivers and the use of siren and calliope whistles on autos within the city limits of New Haven. Chief Cowles holds that the sirens come under the ordinance dealing with nuisances and has issued an order warning autoists that their use must be discontinued, at least within the city limits. Many of the Yale college students who own and drive autos in this city have been vying with each other to see who could produce the laudest calliope or siren whistle, until the principal streets sound like the yards of a big railroad terminal.

A petition has been presented to the board of aldermen by automobilists, asking that one day each week, to be known as "auto day," be specified in which autos and other self-propelled vehicles will be allowed in East Rock, West Rock and Fort Wooster parks. These parks, which are the finest and best known natural parks in this section of the country, comprising many acres of beautiful roads and scenery, are at present closed to all motor vehicles, under penalty of a $20 fine. This action was taken some time ago owing to a number of serious runaways and other accidents which were laid at the door of the autoists.

NO DEWAR TROPHY RACE AT ORMOND.

There will be no race for the Sir Thomas Dewar trophy at the Ormond-Daytona meet in March, the Contest Committee of the Automobile Club of America having decided to substitute a mile race for a special trophy.

The first entry for the Florida speed carnival has been made by W. Gould Brokaw, who nominated Christie's front-drive racer, built for the French Grand Prix last year. Blakely will be the driver.

NEXT A. A. A. TOUR UNDER CONSIDERATION.

Conditions for the next annual tour of the American Automobile Association, in competition for the Glidden trophy, were discussed last week, when Chairman Frank B. Hower, of the A. A. A. Touring Board, met S. D. Waldon and Windsor T. White, representing the manufacturers on the A. A. A. Central Conference Committee, and H. O. Smith, of the A. M. C. M. A., who was specially appointed by the N. A. A. M.

One of the routes most favored is said to be a start at Buffalo, west to Cleveland, south to Pittsburg, Hagerstown and Washington, and north to Baltimore, Philadelphia, New York and Boston, with the finish at Bretton Woods, in the White Mountains. The object is to obtain a route that would be difficult and at the same time lead through a district that can be of most benefit to the automobile industry. There are several suggested changes in conditions, and a definite announcement is expected next week.

THE LATEST BILL AT ALBANY, N. Y.

ALBANY, N. Y., Jan. 27.—Senator McCall introduced a bill to-night amending the motor vehicle law so as to change the speed limit for motor vehicles from one mile in six minutes to one mile in five minutes. This would permit the driving of autos at a rate of twelve miles an hour instead of ten miles an hour, as the law now prescribes in cities, villages and all localities which are built up.

A. M. C. M. A. ANNUAL, DETROIT, FEB. 8.

In accordance with a vote of the members of the American Motor Car Manufacturers' Association, it has been decided to hold the annual meeting of the association in Detroit, Mich., Saturday, February 8.

AMONG THE ACTIVE DOERS IN CLUB LIFE

BAY STATE A. A. TO RUN WASHINGTON'S DAY.

BOSTON, Jan. 27.—The Bay State Automobile Association is to open the 1908 competitive season with an endurance run on Washington's birthday, February 22. The recently-appointed runs and tours committee made this announcement to-day, and it also announced that the run would be 150 miles in length over a triangular course of 50 miles to a leg. The route will be from Boston to Providence, Providence to Worcester, and Worcester to Boston. In selecting this route the committee has had in mind the probable condition of the roads the latter part of February, and it believes that the roads that have been chosen will be the best available at that time of year. They are less likely to be covered with snow and ice than are the highways to the north and east of Boston.

No rules have yet been announced, but the committee has this matter under consideration. The run to Keene last July was so successful and the club received so many compliments upon its conduct of the contest that it is probable that the same rules will be taken as the basis of those governing the coming contest. The committee has in hand, however, the rules of the Chicago and the Philadelphia endurance runs and will make such changes as seem desirable. As the date of the run is only about a fortnight before the opening of the Boston show, when all the dealers will have their new models and when public interest in the new product will be greatest, it is believed that there will be many entries in the run. The committee in charge consists of J. C. Kerrison, chairman; Horace G. Kemp, E. A. Gilmore and Alfred N. Robbins.

SEASON PLANS OF THE WASHINGTONIANS.

WASHINGTON, D. C., Jan. 27.—President Caverley, of the Automobile Club of Washington, has sent a personal letter to each of the members urging their co-operation in increasing the membership. His letter in part is as folliws:

"Some ambitious projects are contemplated during the coming season. A race meet at the Benning race track under the auspices of the club is planned for Decoration Day. A club run to Natural Bridge, Va., via Winchester and Staunton, a distance of some 200 miles over some of the finest roads and through one of the most picturesque sections of the country, is also on the cards. This trip has been taken by several members of the club, who are enthusiastic about the valley of Virginia as a touring ground, where cars, both large and small, find easy traveling. Several short runs to Braddock Heights, Md., Buena Vista Springs, Va., and other interesting points within a radius of 100 miles of Washington, are also in prospect."

CHICAGO A. C. TO WORK FOR NATIONAL LAW.

CHICAGO, Jan. 27.—The Chicago Automobile Club has voted to give its hearty support to the Legislative Board of the American Automobile Association in the congressional campaign for the Federal registration bill. Sidney S. Gorham and his colleagues on the legislative committee of the club have been instructed to give active assistance to the national body. Illinois motorists in favor of the proposed national registration are urged to write their views to Congressman Sterling, of Bloomington, Ill., who is a member of the judiciary committee of Congress, to which the bill has been referred. The directors tabled a communication asking the club to join a revolt against the present state of affairs in the management of the A. A. A.

NOTABLE AUTOISTS AT A. C. OF P. BANQUET.

PHILADELPHIA, Jan. 27.—There will be a great gathering of the automobile clans on the occasion of the annual banquet of the Automobile Club of Philadelphia, on Friday evening, February 28. Among those who will probably attend, and have something to say, are Charles T. Terry, chairman of the Legislative Board of the A. A. A.; Colgate Hoyt, president of the Automobile Club of America; John Bancroft, president of the Delaware Automobile Association; Osborne I. Yellott, president of the Maryland State Automobile Association; Robert P. Hooper, of the Pennsylvania Motor Federation and the Automobile Club of Germantown; Cortland F. Bishop, president of the Aero Club of America; Robert B. Caverly, president of the Automobile Club of Washington, D. C., not to mention numerous local and State officials, including Governor Stuart and Mayor Reyburn.

With a membership of about 550 the Automobile Club of Philadelphia was never in such a flourishing condition, and the attendance will, in all probability, be very large.

LONG ISLAND CLUB TO CONSIDER FEDERAL LAW.

BROOKLYN, N. Y., Jan. 27.—Charles Thaddeus Terry, Chairman of the A. A. A. Legislative Board, will address the members of the Long Island Automobile Club on Friday, January 31, on the Federal Registration bill and the Uniform Motor Vehicle bill drawn up by his board.

By a decision of the board of governors the club has been empowered to secure surety company bail bonds for the use of members, the same to be furnished upon request of any member arrested for alleged violation of the motor vehicle law, the expense thereof being regularly charged to the account of the member securing the use of the bonds.

PENNSYLVANIA HAS ANOTHER AUTO CLUB.

NEW CASTLE, PA., Jan. 27.— At a meeting last week the Auto Club of Lawrence County put itself on a sound basis and adopted by-laws, rules and regulations for its future guidance. Over a dozen new members joined the club at the meeting, and a strong effort will be made to enlist the cooperation of all automobile owners of the district, a committee being appointed to call on automobilists for this purpose. Arrangements were made for the banquet of the road supervisors of Lawrence county, and the decision formed to hold a meeting first Monday in February for the election of officers. David Jameson is now chairman of the club.

STRONG RECOGNITION FOR CHICAGO A. A. A.

CHICAGO, Jan. 27.—President L. E. Myers, of the Illinois State Automobile Association, announces the appointment of the chairmen of five of the committees of that association as follows: Signboards, Joseph V. Lawrence, Chicago Motor Club; legislative, Sidney S. Gorham, Chicago Automobile Club; good roads, L. C. Boardman, Chicago Motor Club; membership, Burley B. Ayres, Chicago Motor Club; publicity, C. G. Sinsabaugh. Paul Picard has been made a director of the association.

RICHMOND COUNTY CLUB ELECTS OFFICERS.

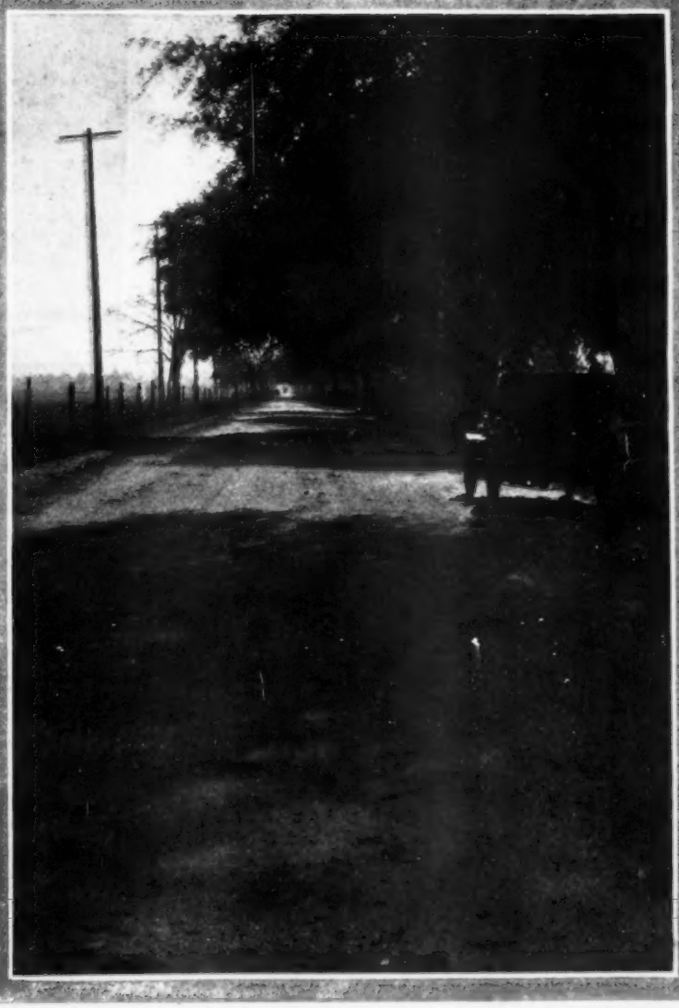
ST. GEORGE, N. Y., Jan. 27.—At the annual meeting of the Richmond County Automobile Club, of St. George, N. Y., Charles A. Schultz was re-elected president. Other officers chosen were vice-president, O. W. Sprigg; secretary, J. J. Worrell; trustee for three years, Dr. J. W. Musgrove.

SAVANNAH COURSE:

A race for six-cylinder stock chassis will form one of the novel features of the speed tests over the 18-mile course near Savannah, March 18 and 19. The race will not be held unless there are five entries, but in view of the popularity of the six-cylinder runabout, this condition will certainly be met. The trophy will be the Southern Six-cylinder Cup. The six-cylinder contestants will be limited to a cylinder displacement of 575 cubic inches.

Preceding the six-cylinder contest will be a stock runabout race for machines not exceeding 375 cubic inches piston displacement, the trophy to be the Southern Runabout Cup. The big feature of the meet will be the 360-mile speed test for stock chassis not exceeding 575 cubic inches piston displacement, the prize being the Southern Challenge trophy, valued at $3,000.

Harvey Granger, treasurer of the Savannah Automobile Club Race Committee, on a visit to New York to complete arrangements, reports tremendous enthusiasm in the South over the proposed races. The militia companies who will provide an efficient guard over eighteen miles of the finest and most picturesque road to be found in the country, are so enthusiastic over the event that they turned out in full force when a call was made for them to assemble for field telephone practice. The Transportation Committee has succeeded in getting excursion rates on all railroads in Savannah from points 200 miles around, and has promise of a rate of one fare and a third for the round trip from New York. Some of the citizens of Kokomo, Ind., in their enthusiasm to watch the performance of the Apperson Jackrabbit, have chartered a special Pullman car for the trip. The Apperson people state that they will have four cars on the ground early in February; the Premier Company will ship three cars within a week.



SCENES ON THE SAVANNAH COURSE, WHERE STOCK CHASSIS RACES WILL BE RUN MARCH 18 AND 19.

THREE BIG RACES.

CONCERNING SPEED INDICATORS OF CENTRIFUGAL TYPES

Editor THE AUTOMOBILE:

IN your issue of December 19, 1907, you published an article under the title "Principles of Speed and Distance Recorders," written by Charles B. Hayward, in which appear several statements that are wholly inaccurate and misleading, and one in particular, to which we take exception. On page 912, first column in his description of the centrifugal force type of speedometer, he says:

"It will be evident from this that the faster the spindle turns, corresponding to an increased speed on the part of the car, the greater will be the tendency of the brass ring to take up a position at right angles to its shaft. But, bearing in mind the varying tension or compression of a spring with an increase in its load, the question will naturally arise: How can the instrument be made accurate at all speeds over a range from a few miles an hour up to a mile a minute? In the first place, the dial is calibrated according to the varying control of the spring at different speeds, the divisions accordingly not being uniform over the entire scale."

If Mr. Hayward was thoroughly posted on speedometer construction, or had only examined the dials of the Stewart and American speedometers, he could have seen at a glance that in these instruments at least the dials are equally calibrated their entire length.

Our catalogue also explains this exclusive feature of our speedometers under the heading, "Description of Instruments," from which we quote as follows:

"The Stewart speedometer embraces a device for transmitting the movement of a part, which is centrifugally actuated, and modifying that movement to actuate the indicating pointer proportionate to the change in speed. To cause the angular movement of the index finger to correspond perfectly to the changing speed, variations in the force, caused by the speed of the centrifugal element and variations of the strength of the spring restraining it, must be compensated for. In the Stewart speedometer this is accomplished by interposing a cam between the centrifugal element and the indexing means. The profile of this cam is shaped in the final assembly of each instrument so as to cause the index finger to indicate exactly the speed at which the vehicle is traveling.

In the process of manufacture, each instrument is mounted on a specially devised calibrating machine and all speeds from minimum to maximum are corrected by means of changes in the profile of the previously described cam surface. Once these corrections are made, the instrument is accurate forever—wear sufficient to cause appreciable inaccuracy being negligible."

Again in our catalogue, page 15, under the title, "Scale Is Equally Spaced," we say:

"The evenly spaced scale is evidence of a principle properly applied. The difficulties that makers formerly contended with and endeavored to correct by using an unequal scale, we correct in the mechanism of the instrument itself, which feature is fully covered by patents.

"The unequal scale is not only a disfigurement, but tends to deceive the eye. There is also a tendency to doubt the accuracy of an instrument that will measure the first ten miles in inches and the last twenty miles in a space so small as to be read with difficulty. Observe the ease with which the Stewart dial may be read."

Mr. Hayward also states that the extreme of simplicity is not secured in the centrifugal type and in another type, which he describes, claims it to be competent of a degree of accuracy unattainable in other fields, from which the reader must infer that the centrifugal force type is of complicated construction and inaccurate. Inasmuch as he has erred regarding equal calibration of the centrifugal type, it is evident he is not acquainted with the construction of Stewart or American speedometers and may have qualified his statement as regards simplicity and accuracy had he been familiar with these instruments. When an instrument is absolutely accurate, it leaves nothing to be desired in the degrees of accuracy, and as our patented cam (as explained) permits of adjustments that secure indisputable accuracy, it is difficult to distinguish the degree of accuracy he credits to this other type as not attainable in ours.

We take exception to Mr. Hayward's statements because it is due to the many thousands who are using Stewart and American speedometers to know that the failings he ascribes to the centrifugal force type of speed indicator to not apply to ours. After all is said, a theoretical discussion of the relative merits of different types counts for nothing as against what the same instruments will do in actual service. It is the tried and proven that must be recognized as against the unproven. We want to say for the benefit of those car owners who may be at a loss to know which type to purchase that they test for themselves the different types and we will gladly at all times furnish either of our instruments to be put on the car in competition with any other on the market and abide by the result.

STEWART & CLARK MANUFACTURING COMPANY.

CHICAGO, Jan. 27, 1908.

AKRON TIRE COMPANIES HOLD ELECTIONS.

AKRON, O., Jan. 27.—At the annual meeting of the B. F. Goodrich Company this week, the old board of directors were elected as follows: Col. George T. Perkins, F. H. Mason, B. G. Work, E. C. Shaw, H. R. Raymond, C. C. Goodrich, George W. Crouse. The directors elected officers as follows: President, B. G. Work; first vice-president, F. H. Mason; second vice-president and general sales manager, H. E. Raymond; secretary, C. B. Raymond; assistant treasurer, W. A. Means; general manager of works, E. C. Shaw.

The annual meeting of the Swinehart Clincher Tire & Rubber Company resulted in the election of the following directors: J. A. Swinehart, B. C. Swinehart, W. J. Frank, J. W. Rock, C. O. Baughman and W. H. Rudgers, who chose the following officers: President, J. A. Swinehart; vice-president, B. C. Swinehart; secretary and treasurer, C. O. Baughman. According to the report of the president, the past year has been a prosperous one, and in support of his statement he stated that in the year 1904 the output of the company was 2,527 tires, while at present the company has out and in use over 20,000 tires. Mr. Swinehart stated that the increased business was largely due to the more favorable attitude of garage men. The company will establish branch houses in Philadelphia and St. Louis soon.

RETAIL DEALERS WILL FORM AN ASSOCIATION.

A movement is on foot for the enrolling of the 2,000 retail automobile dealers of the United States into a national organization, to be known as the Association of Automobile Dealers of America. It is declared that the dealers, who last year sold 50,000 cars at a valuation of nearly $100,000,000, could, by co-operation, bring about many much needed reforms in transportation charges, improve the second-hand car business, keep records of salesmen, mechanics and chauffeurs, and do much to remedy unbusinesslike methods. Charles A. Wardle, who has for some years been connected with the A. L. A. M., will be manager of the association.

GROUT FACTORY NOW IN NEW HANDS.

ORANGE, MASS., Jan. 27.—The entire plant of the Grout Bros. Automobile Company in Orange has been sold to Wm. L. Grout, the millionaire sewing-machine manufacturer, of Greenfield, Mass.—the Grout Bros. having completely withdrawn from the business. The future active management will be in the hands of well known automobile men, and the plant will be run upon a larger scale than ever before. The latest model embraces all of the latest and best features in automobile construction.

AFTER THE BIG SNOW IN WISCONSIN PURCHASERS OF RAMBLERS WERE GIVEN DEMONSTRATIONS NEAR THE KENOSHA FACTORY.

MR. BRISCOE'S WESTERN OBSERVATIONS.

THAT the recent financial crisis was only a rich man's panic is the belief of Benjamin Briscoe, chairman of the Committee of Management of the American Motor Car Manufacturers' Association, who has just returned from a two weeks' Western trip. In speaking of his trip Mr. Briscoe said:

"There is no question in my mind that the recent crisis in Wall Street was merely a rich man's panic, brought on by certain conditions which I believe can be blamed to a group of financial pirates who have been plunging heavily and recklessly; many of them using the people's money. I have come to this conclusion after thoroughly studying the situation and after lengthy talks with prominent Western banking and manufacturing interests. The West was never in a more healthy and flourishing condition. The crops are heavier than at any time in the history of the country."

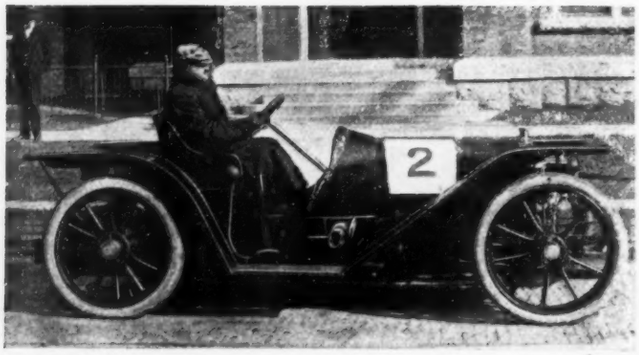
COLONEL CLIFTON ON THE TRADE OUTLOOK.

BUFFALO, N. Y., Jan. 27.—The recent financial troubles which were felt throughout the country did not materially affect the working forces of the George N. Pierce Company and the E. R. Thomas Company, of this city. Col. Charles Clifton, of the Pierce Company, said:

"The future of the automobile industry does not hinge upon the present financial conditions. The fact seems to be that every line of industry suffers from the stagnation, and the automobile makers are seemingly but waiting for the revival which is not far off. I have learned that other industries have even cut their helping force in half. This is not true in automobile circles, for to-day we are employing nearly our entire force and turning out more cars than last year."

The word from the Thomas factory is that the great demand is for their highest priced car, the big six-cylinder Flyer.

A TOUCH OF REAL WINTER IN CENTRAL PARK, NEW YORK CITY, AND THE PACKARD DOING DUTY AS A SNOW PLOW



AMERICAN ROADSTER THAT MADE FASTEST TIME AT HOUSTON.

ENDURANCE RUN OF HOUSTON'S AUTO CLUB.

HOUSTON, TEX., Jan. 27.—Weather conditions that were favorable ushered in the day set for the endurance run of the Houston Automobile Club, on January 12, and fifteen cars participated. A most successful run it promised to be, but several accidents, one in which one of the cars collided with a street car resulted fatally, resulted in the run being officially called off by the officials. All of the cars, with the exception of three, finished with perfect scores, however, and the best time of the day was made by the American Roadster, driven by E. A. Sontag, who covered a distance of five miles on the straightaway shell road between Cypress and Houston, at the rate of seventy miles an hour. The endurance test was not to be a race, but local rivalry between car owners and dealers made the run decidedly interesting from a speed standpoint. The following cars finished with unofficial perfect scores:

American Roadster, 40-horsepower, driven by E. A. Sontag, for Empire State Motor Company.
Frayer-Miller, 50-horsepower, owned and driven by W. T. McCallip.
Buick, 22-horsepower, owned and driven by Max Stubenrauch.
Dixie-Flyer, 28-horsepower, driven by Mr. Ayres, for Southern Motor Company.
Ford, 20-horsepower, driven by Van Curtis, for Wade Cox.
Frayer-Miller, 50-horsepower, driven by W. C. Monroe, for Barden Electric and Machinery Company.
Wayne, 30-horsepower, owned and driven by Edward F. Marone.
Overland, 20-horsepower, owned and driven by John Patrick.
Ford, 40-horsepower, driven by Wade Cox, for H. T. D. Wilson.
Maxwell, 14-horsepower, owned and driven by R. W. Aiken.
Thomas, 40-horsepower, owned and driven by J. K. Foley.
Ford, 15-horsepower, owned and driven by R. R. Ratcliff.

The Houston Automobile Club now has a membership of 60 and is rapidly gaining in local influence. An appropriation of $500,000 is to be spent on the roads of the county, and the club has had much to do with securing this handsome sum for road improvement. Harris county now has 200 automobiles, the largest number of any county in Texas.

DIXIE FLYER THAT FINISHED WITH A PERFECT SCORE.

OWEN STARTS ON SECOND "MUDLARK" TRIP.

ALBANY, N. Y., Jan. 27.—Equipped with a formidable array of shovels, picks, ropes and tackle for emergency work, Ralph Owen, in a 40-horsepower Oldsmobile, arrived here to-night on a pathfinding trip from New York to New Orleans. The object of the trip is three-fold. The first being the gathering of data relative to the roads between New York and the metropolis of the gulf; the second to gather data relative to the political situation, and the third it is expected that the car which Mr. Owen is driving, at the completion of its trip, will be used as the official car at the Mardi Gras celebration beginning the end of February.

From Cleveland to Louisville, Birmingham and New Orleans, Mr. Owen will attempt to find the shortest and best roads. The information and route will be published in pamphlet form for the benefit of the motoring public.

At Cleveland F. L. Smith will join the party, and from then on will make a canvass of the towns through which they pass relative to the political situation, endeavoring as far as possible to get the strength of the various presidential candidates. The information thus gained will be given to the newspapers and to the national political committees.

RALPH OWEN IN HIS OLDSMOBILE READY FOR THE START.

JANUARY AUTOMOBILE TRADE DIRECTORY.

Three hundred and four pages comprise the January issue of the "Automobile Trade Directory," published quarterly by the Class Journal Company, Flatiron Building, New York. The Directory, which covers not only the entire automobile industry of the United States, but includes every industry which in any way contributes to the production, operation or care of horseless vehicles, is classified in the simplest and most efficient manner. An idea of the extent of the ground covered is obtained from the fact that the index to classifications alone calls for more than 1,400 headings. Manufacturers in each branch of the automobile industry are classified under the heading of the goods they produce, there being sufficient divisions in all the branches of the trade to make the reference as simple as possible. Thus under the heading tubing, are separate divisions for makers of brass and copper tubing, flexible metallic tubing, soft rubber tubing, hard rubber tubing, and steel tubing. This system is pursued throughout the entire industry. The compilers claim that the lists are brought up to date with each issue, that every firm is included, and that all the firms are producing the articles under which they are classified. A series of tables and data for engineers form a valuable addition for reference purposes.

CLEVELAND PATHFINDER, FULLY EQUIPPED FOR THE PIONEER RUN FROM JACKSONVILLE TO MIAMI, FLA.

ORMOND PATHFINDER REPORTS PROGRESS.

Official Pathfinder Cleveland, forerunner of the batch of tourists who will make the trip from Jacksonville to Miami, Florida, reports a complete string of signposts in its wake as far as Ormond.

The big Cleveland touring car, with James Laughlin, 3d, at the wheel; George E. Sebring, of Daytona; Walter S. Drennen, and Photographer Spooner, in the tonneau, and a pioneer outfit on the running board, started from Jacksonville on January 23, and reached St. Augustine the same evening. It had been intended to make Ormond that night, but owing to several departures from the right track for the purpose of verifying the cross roads and placing signs, much time was lost. Though the finding of the path the first day out was a comparatively easy matter, the party managed to get lost twice. Roads consisted, for the most part, of a hard and sometimes rough path through the scrub palmetto, and the only scenery was the same scrub and the high pine trees cut and bucketed by the turpentine men. Six fords had to be passed through, but they were all of hard bottom.

Partly because the shades of night were overtaking them fast and partly because a raging forest fire overtook them seventeen miles from Ormond, the Cleveland pathfinder had to be pushed to its utmost at the close of the second day out. The fire was an unrehearsed thriller which loomed up one hundred yards away when the car had just passed over the second automobile bridge erected by Thomas White, of Cleveland. After a second's hesitation it was decided to rush the machine along the edge of the forest conflagration. It was an exciting moment, for the flames rose to a height of ten to fifteen feet, and threatened to reach the automobile. A wild cat rushed yelling before the flames, then a dense wood with thick overhanging foliage was plunged into and the car pulled up finally at Ormond, having covered a distance of 84.9 miles for the day. There was a stretch on the fine shell road outside St. Augustine where a speed of 55 miles an hour could be maintained, but the average going through turpentine camps and stills was of a much more modest nature. Though there will be some rough riding, there will be no difficulty in finding the trail, for the Cleveland pioneer has placarded every spot.

S. A. E. BECOMING MORE REPRESENTATIVE.

That the need for independent engineering investigation wholly free from any trade affiliations is generally recognized is evident from the manner in which the membership of the Society of Automobile Engineers is rapidly increasing. Though only entering upon its third year of existence, it already includes in its ranks a large percentage of the designers of the most prominent cars built in this country.

Among them are Russell Huff, engineer of the Packard Company; David Fergusson, designer of the Pierce cars; A. L. Riker, designer of the Locomobile; Harold B. Anderson, chief engineer of the Winton Company; Henry Ford, head of the Ford Motor Company, and designer of all the Ford cars; B. D. Gray, chief engineer of the American Locomotive Automobile Company, builders of the Berliet; J. G. Perrin, designer of the Lozier; W. A. Wall, of the National Motor Vehicle Company; Alanson P. Brush, former designer of the Cadillac, and more recently of the Brush runabout; Hiram P. Maxim, late chief engineer of the Electric Vehicle Company, and designer of the Columbia gasoline and electric cars, and who is now building a line of new electrics; John Wilkinson, designer of the Franklin cars; Harry A. Knox, president of the Atlas Motor Car Company; Thomas J. Fay, who was responsible for the first Simplex cars and later designed the Ellsworth; Walter C. Baker, formerly of the Baker Motor Vehicle Company; Henry Souther, consulting engineer and metallurgist of the Association of Licensed Automobile Manufacturers; C. R. Greuter, designer of the Matheson cars; C. T. Jefferys, of the well known firm that builds the Rambler cars; Howard E. Coffin, of the Thomas Detroit factory; E. T. Birdsall, designer of the new Selden cars; F. B. Stearns, head of the company of the same name building the Stearns cars; Joseph Tracy, the well-known racing driver and consulting engineer; Charles E. Duryea, consulting engineer of the American Motor Car Manufacturers' Association; Herman F. Cuntz, the leading technical spirit of the Licensed Association and a number of others prominent in the automobile world. It is the intention of its founders that it should be representative of the industry as a whole, and to accomplish this end it is open to manufacturers of accessories and their authorized technical assistants, who are admitted to associate membership.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

The first Model H Marmon water-cooled car arrived in Boston last week. Howard Marmon, of the Nordyke & Marmon Company, is explaining its many new features to the local agent, F. E. Wing.

Two licenses were revoked by the Massachusetts Highway Commission last week, and among the large number of new licenses granted was one to an 11-year-old son of a prominent Boston auto dealer.

Its plant having been badly damaged by fire, the Delaware Auto Storage and Repair Company, of Wilmington, Del., has gone into the hands of a receiver, Christopher L. Ward being named as such by the Court of Chancery.

The Brown Auto Top Company, of Philadelphia, has inaugurated a new deal by establishing a general automobile repair shop at the Belmont avenue entrance to Fairmount Park. The new shop will be run in connection with the Belmont Garage.

Registrations in the State of New York, on Thursday, January 23, reached the 50,000 mark, license number 50,000 having been issued to the Lozier Motor Company. This number will be carried by the Lozier demonstrating cars during the 1908 season.

Though it was only incorporated in 1904, the London Auto Supply Company, 1229 Michigan avenue, Chicago, makers of the London auto tops, Lasco folding glass fronts and windshields, has found it necessary to increase its manufacturing facilities and obtain more room on several occasions. Due to the general satisfaction given by their tops and glass fronts, their sales were more than doubled during the past season. An attractively illustrated catalogue showing the entire line has just been issued.

In connection with their electric pleasure and commercial cars, the Studebaker Automobile Company, South Bend, Ind., are now marketing mercury arc rectifiers to transform alternating current, as commonly employed for lighting and power purposes, to direct current, in order that it may be utilized for charging batteries. The introduction of the rectifier is claimed to reduce the already low cost of operation of the electric more than one-half, so that where the expense of charging a two-passenger electric vehicle has formerly averaged $25 to $30 a month, it should not now exceed $8 to $10 a month.

The factory of the Wayne Automobile Company, in Detroit, is one of the number that has not been completely shut down at any time during the recent financial disturbance and preparations are now being made to resume with a full force in a very short time. Further evidence of the fact that these builders have not been disconcerted in the least is to be found in the fact that they are now going ahead with the construction of a large testing course adjacent to the works in Piquette street, Detroit. When the property was acquired some years ago, a large piece of land was left vacant for this purpose, but it was not until the present year that the company cared to go to the expense of building the track.

The effect of ball-bearings on the efficiency of a car is immediatey apparent in its ton-mile capacity per gallon of fuel, and the Hess-Bright Manuffacturing Company, Philadelphia, Pa., calls attention to the showing of cars equipped with Hess-Bright ball-bearings as compared with those not having this advantage. The Chicago Economy test of last fall brought out 23 cars of 18 different makes, the distance being 95 miles. The winning car, which averaged 45.4 ton-miles per gallon, was equipped with "HB" bearings, as were also 12 cars of 7 different makes which averaged 32.7 ton-miles per gallon, as against 28.3 ton-miles for the remainder. The cars that scored second and third were also thus equipped.

Suit has been entered by Hopewell Brothers, of Cambridge, Mass., through their patent attorneys, Crosby & Gregory, against the Boston branch of the Post & Lester Company, of Hartford, Conn., for selling the Perfect tire case manufactured by W. H. Wiley & Son, of Hartford, and which is alleged to be a direct infringement of their patent. The recent action brought against the Auto Supply Company, of Boston, agents for the Allen tire case, has been discontinued, a satisfactory settlement having been reached. The Allen Auto Specialty Company, of New York, will henceforth handle the Hopewell Brothers' fabric line in its entirety in the States of New York, New Jersey and Pennsylvania.

As the result of the "Continental canvass" made by General Manager J. M. Gilbert, of the Continental Caoutchouc Company, he has found that things are not half as bad as they seem to some people. "Automobiling as a sport is in a pretty lively condition as yet," said Mr. Gilbert when seen at the Continental headquarters, at 43 Warren street, New York City. "There is plenty of vitality in the industry and the demand for new cars goes to show that there are a good many people who have ready cash and who are willing to spend it for what they want." Mr. Gilbert's canvass was not of the haphazard or hearsay order, inquiries being made throughout the country and the results carefully tabulated, the manufacturing establishments in Detroit, Cleveland, Buffalo, Chicago, Indianapolis and other cities being well covered. Many of the plants that were shut down entirely are now running full time and many others are making preparations to resume shortly.

NEW AGENCIES ESTABLISHED.

Jacobs & Bartlett have opened their new salesrooms at 887 Boylston street, Boston, and will represent the Allen-Kingston cars in Boston and vicinity.

A motorcycle store, devoted to motorcycles only, has been opened by the American Motor Company, 218 Clarendon street, Boston, where the M. M. motorcycles will be carried exclusively.

The Glide car will be handled in St. Louis and western Missouri during the present year by the Weber Implement Company, 415 West Main street, St. Louis. The Dupree Commission Company, Waco, Texas, will handle the Glide in central Texas territory.

J. D. Lee, Jr., local manager of the Girard Motor Car Company, of Philadelphia, has just secured the agency for the Fiat for Eastern Pennsylvania. Allen Dalley was the former local representative. The Girard Company already handles the Cleveland and the American Mors.

C. A. Benjamin, of the Aerocar Motor Company, of Detroit, has been taking a whirl through some of the Eastern States during the past ten days closing contracts for agencies for 1908, and reports the following connections to handle the Aerocar line: The George H. Lowe Company, Boston; G. M. Drake, Huntington, L. I.; George A. Bauer, Rochester, N. Y.; Maxwell Auto Company, Erie, Pa.

Arrangements have been completed by Paul Lacroix for direct Renault representation at 1549 Michigan avenue, Chicago. The Western house, which will be in charge of C. T. Ziegler, will be a branch of the Renault Frères Selling Branch at New York, and, like the metropolitan establishment, will carry all models, be completely supplied with spare parts, and equipped for repair work. An expert mechanic is being sent from the Billancourt factory to take charge of this department. Philadelphia and Eastern Pennsylvania will be supplied with Renault cars by Prescott Adamson, located at Broad and Spring Garden streets, this agency, now handling Columbia gasoline and electric cars, having closed contracts for the representation of the popular French marque.

RECENT TRADE REMOVALS.

The Boston Auto Light Company, formerly located in the Motor Mart, that city, has moved into a larger salesroom, more centrally located, at 751 Boylston street.

The local G. & J. tire agency, at 711 North Broad street, Philadelphia, will move to much larger quarters next door, at No. 713, about March 1. The new building is 30 by 140 feet in dimensions, and will afford ample accommodations for the rapidly growing business of the agency.

The Cameron Motor Car Company, of Brockton, Mass., has purchased the building and equiment of the Beverley Manufacturing Company, at Beverley, Mass., which was formerly devoted to the Upton transmission gears. This plant will be run in connection with their present works at Brockton. The main offices of the company will be at the Beverley plant.

The Palmer & Singer Manufacturing Company are now installed in their new quarters, at 1620, 1622 and 1624 Broadway, from which address the Simplex, the Isotta-Fraschini and the three lines of Palmer & Singer cars will be marketed. Four floors of the building are devoted to the garage, which has a capacity of 150 cars, making it one of the largest on Broadway. Owing to its convenient situation, it has sprung into immediate popularity with the residents of the Circle district.

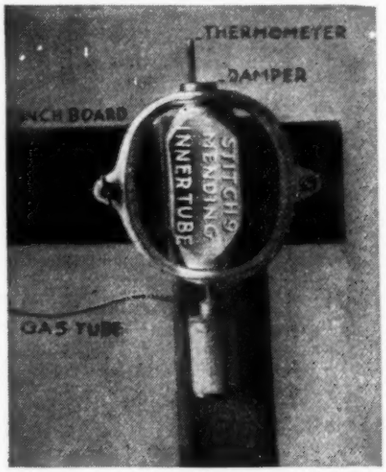
PERSONAL TRADE MENTION.

P. O. Sheehan, well-known throughout the bicycle and automobile trade, resigned last week as sales manager of the Old Colony Light Company, of Boston, makers of the Puritan gas tanks.

J. S. Draper, of the Wayne Automobile Company, is the guest of the Boston representatives of the Wayne, the Morrison-Price Company. Mr. Draper reports that business is steadily improving in the East.

INFORMATION FOR AUTO USERS

Stitch-in-Time Vulcanizers.—The prolongation of the life of an automobile tire is assured by attention to the use of a vulcanizer whenever defects reveal themselves. Three distinct models of these instruments, now extensively used by automobilists, are manufactured by the Stitch-in-Time Vulcanizer Company, Topeka, Kansas. The latest of the trio is the "Stitch Nine" vulcanizer, specially



THE NEW "STITCH NINE" VULCANIZER.

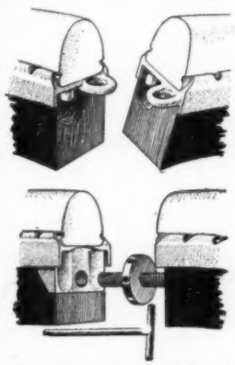
designed to fit flat tread tires, and for mending inner tubes. Its special features are that it can be heated by either gas or gasoline without changing burners, will fit any tire from the smallest to the largest, in both circumference and diameter, and has a swivel yoke admitting of the faces of the vulcanizer adjusting themselves to equal pressure at every point of contact. The "Stitch Nine," which is made of aluminum and weighs only three pounds, will vulcanize either on the tread or side close up to the rim. The two other instruments are the "Pig" vulcanizer, which will take a patch from 9 to 10 inches long the full oval of the tire, to 1 1-2 inches of the rim, and the "Stitch-in-Time" vulcanizer for smaller repairs.

Dover Safety Waste Cans.—The rules of the Board of Fire Underwriters call for the placing of all oily waste and rags in a metal receptacle with a cover of the same material, as such substances are apt

DOVER WASTE CAN WITH SPRING COVER.

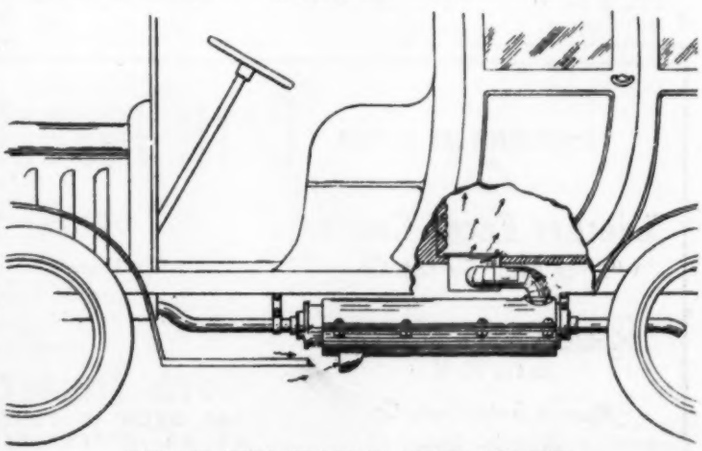
to take fire spontaneously. To meet these requirements, the Dover Stamping & Manufacturing Company, 385 Putnam avenue, Cambridge, Mass., are putting on the market a can of this type which is provided with a recently-invented self-closing cover. The device is extremely simple and durable, beside being positive in action, so that the cover is always kept tightly closed. The can itself is of heavy, durable construction. By a new method of construction exclusive with these makers, no solder is used in the construction of the can. The material consists of black steel sheets, galvanized after making, so that they will stand the hottest fire without falling apart. They are made in six sizes, ranging from 12 by 15 inches up to 24 by 38 1-2 inches, and have been especially designed for garage and factory use. The illustration gives an idea of the general appearance of the complete can, as well as that of the self-closing cover.

Half-Nelson Emergency Tires.—Running on a flat tire means the price of a new shoe as well as a new tube, while any distance on the rim entails the expense of a replacement there, so that it certainly does not pay to be caught far from home or a repair shop without some means of protecting the wheel and rim. Realizing this, the Half-Nelson Tire Company, 1917 Portland street, Minneapolis, Minn., have brought out a patented emergency tire of this name which will pay for itself by the aid rendered in a single case of emergency. The Half - Nelson emergency tire consists of a number of independent sections with a double hook and eye device that cannot possibly pull apart, the last joint which is tightened up when the tire is in place on the wheel being made with a right and left-handed screw. The details of the two forms of joints are shown in the accompanying illustration.



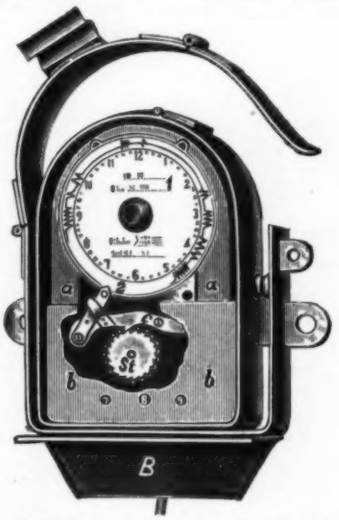
METHODS OF FASTENING HALF-NELSON TIRE.

Pence Limousine Heater.—The necessity for heating the interior of a closed car during winter is evident, while the problem entailed would appear to be of the simplest nature, as many times the amount of heat required is being wasted through the muffler every minute the motor is running. But not every attempt at accomplishing this has proved successful by any means, many having the disadvantage of introducing the burnt gases from the cylinder directly into the car, making the heat a cause of annoyance rather than a comfort. To overcome this, the Pence Automobile Company, 717 - 719 Hennepin avenue, Minneapolis, Minn., has recently perfected an improved type of heater for this purpose. As shown by the accompanying illustration, it consists of a special jacket for the muffler with an inlet for pure cold air at the bottom forward, and an outlet for the heated air connected with a register placed flush with the floor of the car. Only pure air is warmed and introduced.



HOW THE PENCE HEATER IS APPLIED AND USED.

A Speed and Distance Recorder.—The latest development in the line of speed indicators is the Velograph, produced by Velograph, Limited, of Berlin, and sold in America by the National Sales Corporation, of 296 Broadway, New York. Total distance covered, speed at every portion of the journey, and all stops are permanently recorded on a circular disc in the instrument, thus giving a complete record of the movements of the vehicle, which is especially valuable for commercial automobiles. The Velograph is wound up like a clock at the commencement of the day's work. A circular disc divided into hours and minutes is driven by the clockwork, while a pointer carrying a pencil and operated by a flexible cable from a road wheel makes a continuous record around the outside edge of the disc. Simultaneously with the up-and-down movement of the pointer, the disc revolves around its center, a zig-zag line being traced, the more acute the angle of the zig-zag the quicker the speed, and *vice versa*. The instrument is used very extensively in Germany by the postal authorities and important business houses.



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